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ADDRESSES AND ORIGINAL ARTICLES

CONGENITAL DISEASE*

BY J. B. S. HALDANE, F.R.S.

PROFESSOR OF BIOMETRY, UNIVERSITY COLLEGE, LONDON

WE say that a person is afflicted with congenital disease if he is born diseased, and also if he develops in later life a disease which we regard as wholly or mainly determined at the time he was born. As examples of the first class we have congenital syphilis, pyloric stenosis, and ichthyosis fœtalis; and of the second Huntington's chorea, which develops at an average age of approximately 35 but is yet believed to be due to an abnormality existing in the patient at birth, or hereditary optic atrophy, which may also develop over a great range of ages, but which we believe to be congenitally determined.

In the majority of cases of disease, however, we have to deal with the interaction between nature and nurture, or, as they are less appropriately called, heredity and environment. Sometimes one of the causes is clearly predominant, but usually there is at least some interaction of the two. For example, there is perhaps reason to believe that there may be some degree of natural immunity to syphilis, and the onset of hereditary optic atrophy may to some extent be determined by environmental conditions, and so on.

As a geneticist my primary interest is naturally in differences of nature, differences in the hereditary endowment of an individual. The question immediately arises as to how we are to draw the line between nature and nurture. Suppose, for instance, that a fox-terrier bitch has a puppy which grows up with bent legs. We can ask whether that abnormality is due to a deficiency of vitamin D in the diet when the puppy was young—in which case it would be due to nurture—or whether it is due to the fact that the father was a dachshund—in which case it would be due to nature. Nevertheless, in the great majority of cases we are unable to give an absolutely straightforward and certain answer to such a question.

In practice, where experiment is possible, we try to keep nature constant in one series of experiments and nurture constant in another, just as, if we were trying to discover the factors on which the volume of a gas depended, we should first of all keep the temperature constant while varying the pressure and so discover Boyle's law, and subsequently we should keep the pressure constant while varying the temperature and so discover Charles's law.

We can approximate to a constant nurture for a number of animals in many ways. We can give the same kind and quantity of food and drink, maintain the same temperature, keep the experimental animals in conditions under which they are equally exposed to infection, and so on. Obviously the most difficult thing to standardise in animal experiments is prenatal environment. For example, in many stocks guinea-pigs with extra toes are by no means rare. And Wright observed that this polydactylism is more frequent in the offspring of young than of old mothers. Later on we shall see a similar case in man.

The converse problem is how to keep nature constant, how to obtain a group of animals all of whom have the same hereditary endowment which can be tested in different environments. There are two methods in animals: one is to establish, by inbreeding, a pure line; the other is to obtain a clone, a group of animals related to one another by vegetative reproduction only and not by sexual processes. Unfortunately—or fortunately—in man there are no pure lines, and the largest "clonal" populations are of five quintuplets derived from a single zygote, though monozygotic twins from a single fertilised ovum are relatively common. The ideal experiment with human beings would be something on these lines: one would induce an egg to divide into a large number of potential embryos and transfer them into the uteri of a number of pregnant women so that their behaviour could be compared after they had been in a number of environments during the first nine months of life, which are, for certain purposes, the most critical. It is obvious that we cannot do this. How, then, can we tackle the problem of the relative importance of nature and nurture?

We should first study cases where either nature or nurture appears to predominate. On the one hand will be the sharply defined hereditary diseases, and on the other infections to which most people are susceptible. Only later on shall we come to cases where there is doubt as to whether nature or nurture is predominant. For example, there are phthisis and acute rheumatism, in which heredity and environment are both operative as causes.

AUTOSOMAL DOMINANT GENES

A part of Lewis and Embleton's (1908) pedigree of split hand and foot, or "lobster claw," is shown in Fig. 1. It will be seen that in this pedigree every affected individual, with the important exception of the first, is the child of an affected individual; the abnormality never skips a generation, though its manifestation varies slightly. Affected individuals pass on their affliction to approximately half their children, and that without regard to sex; both fathers and mothers transmit it equally, and they are equally likely to transmit it to their sons and their daughters.

Such a condition is said by geneticists to be due to an abnormal autosomal dominant gene. By "gene" we mean a structure in a particular chromosome which is of such a character that it is reproduced at each cell division and handed down as a unit. A dominant gene produces

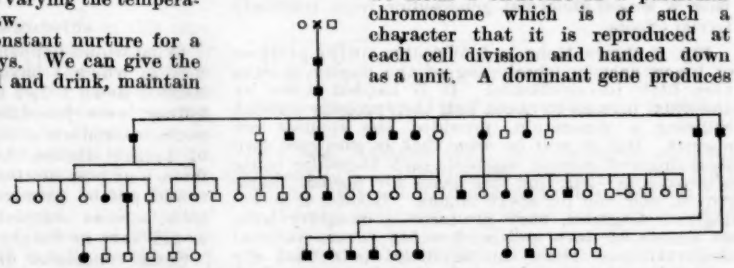

FIG. 1—Pedigree of split hand and foot, after Lewis and Embleton. A collateral branch and some miscarriages have been omitted. Here and in other Figures, unless the contrary is stated, spouses of affected persons were normal. (Circles = females; squares = males; triangles = sex unknown. Black symbols = affected persons; hollow symbols = unaffected persons.)

* Lloyd Roberts lecture, delivered at the Royal College of Physicians of London on Nov. 17th.

a visible effect on the organism even when only one such gene is present in the zygote, derived from one parent, whilst the homologous chromosome, derived from the other parent, carries a normal gene. By the term autosome is meant a chromosome of which a pair is found in each nucleus of a normal individual of either sex, as opposed to a sex chromosome.

Many abnormalities are due to autosomal dominant genes. It must be remembered that in such cases the degree of abnormality may vary greatly.

Thus Harman (1910) describes a case where a grandmother and three grandchildren (part of a much larger pedigree) all had cataract so severe as to require operation, sometimes in early childhood. The father of the three children who transmitted the disease had 6/6 vision in each eye at the age of 46, and was a skilled workman. But he had "the faintest order of lamellar cataract with a few denser spots in the anterior polar region."

Thus although in some cases the manifestation of an abnormal gene may invariably be an obvious abnormality, this is not always so, even if some abnormality is present.

What happens if there are two such abnormal genes in a single individual? Here we can obtain decisive evidence only from animal experiments. In Dexter cattle the legs are shorter than in normal cattle. Progeny of Dexter mated to normal are half

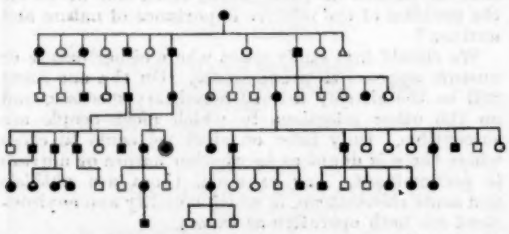

FIG. 2—Pedigree of brachydactyly, after Mohr and Wriedt. The girl represented by a ringed circle was grossly abnormal.

Dexter and half normal; the condition is precisely similar in its inheritance to lobster claw. But mate two Dexters together and a quarter of the progeny should receive an abnormal gene from both parents. What happens to the quarter in question? In this case they are represented by calves which have bull-dog-like faces, hæmorrhagic thyroids and other defects, and which invariably die before or shortly after birth.

There is evidence for the existence of similar phenomena in human pedigrees in which persons with a single abnormal gene suffer from relatively trivial effects.

Fig. 2 shows Mohr and Wriedt's (1919) pedigree of brachydactyly (shortening of the fingers causing very little inconvenience). It is handed down by abnormal persons to about half their progeny without skipping a generation, provided the spouses are normal. But it will be seen that in one case two short-fingered cousins married, each therefore being heterozygous—carrying one gene for normal finger growth and one for short fingers. Besides a short-fingered daughter, they produced a daughter with no fingers or toes and with other severe skeletal abnormalities. There can be little doubt that she was a homozygous abnormal, that is to say, had received an abnormal gene from each parent.

To make a crude analogy, let us imagine that we inherit one eye from each parent. The mother hands down the right or left at random to her children while the father also hands down one eye at random. In that case half the children of one-eyed parents with normal spouses would be one-eyed. On the other hand, if two one-eyed people married, a quarter of the progeny would be eyeless. That analogy has at least some justification. The genes which are responsible for hereditary diseases are organs, not indeed within the organism as a whole, but within the nucleus of a cell. Each gene controls a specific function rather than a structure. But, unlike the organs in the body as a whole, they reproduce directly. When a cell divides, two new genes are formed from an old one by a process which is possibly division but more probably something like copying. Hence, whereas an abnormality in a finger due to environmental influence (say a callosity formed as an adaptation) is certainly very rarely, and probably never, inherited, an abnormality in a gene due to environmental influences is very often handed down to posterity.

ORIGIN OF NEW GENES

The pedigrees so far discussed represent a simple kind of inheritance. Although they only apply to a limited number of diseases, yet if the laws of heredity which they illustrate are really valid, then a curious consequence follows. Adam and Eve, or even Noah and his wife, must have suffered from a very large variety of congenital abnormalities. They must have been a reservoir of every conceivable heritable defect which is shown in their offspring to-day. We have no medical report to guide us, but they are certainly said to have enjoyed a longer life than would appear probable under this hypothesis. A similar deduction may be made on more modern theories of human ancestry.

When we trace these pedigrees of dominants backwards we frequently come upon the appearance of an abnormal from two normal parents. In cases such as lobster claw the hypothesis of illegitimacy may probably be ruled out. A person so afflicted cannot escape notice, and, had a normal woman produced a lobster-clawed child after association with a lobster-clawed man, attention would have been called to the fact and adultery inferred.

The process by which new genes originate is called mutation. We can get evidence from animals and even from man with regard to its frequency, but we know little of its nature. It may represent a failure to copy the normal gene in a cell division, or it may represent a change in a normal gene which is then copied. We can increase its frequency several hundred fold in some animals and plants by X rays, but unfortunately—or fortunately—we do not know how to diminish its frequency.

AUTOSOMAL RECESSIVE GENES

What would happen if kidneys were inherited in the way in which I have imagined that eyes might be handed down? Let us suppose that absence of one kidney were hereditary. Such a condition would perhaps produce a slightly greater tendency to die of kidney disease, but apart from surgical interference or post-mortem examination the abnormality would not be detected. On the other hand, if two such persons married, a quarter of their progeny would have no kidneys at all.

Some congenital diseases are determined in this way, and are said to be due to autosomal recessive genes. Fig. 3 (Sjögren 1931) is a pedigree of juvenile amaurotic idiocy. In the sense in which that phrase is most commonly used, it is not a hereditary disease at all. Indeed such a condition cannot be handed

down from parent to offspring, because afflicted persons die before they have time to reproduce. The disease is however familial, often occurring in several sibs (brothers or sisters) and in sibs belonging to related families. The parents of the two affected families in Fig. 3 were related to one another and also to their spouses. In each the wife was a cousin of the husband, and it is fairly clear from a study of similar conditions in animals, where experiment is possible, that a recessive gene (a gene which does not show to any appreciable extent when only one is present) was handed down from one of the two ancestors in the top left-hand corner of the pedigree, through different lines, to a man and wife who married; and a number of their children developed the abnormality due to the presence of two abnormal genes. Such a hypothesis must of course be confirmed by statistical methods.

Many other conditions are similarly determined, or appear to be. Such are alkaptonuria, phenyl-

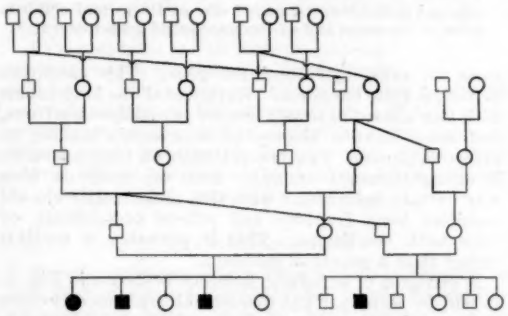

FIG. 3—Pedigree of juvenile amaurotic idiocy, after Sjögren.

ketonuria, and albinism. In alkaptonuria the patients excrete homogentisic acid, a product of the oxidation of tyrosine and perhaps of phenylalanine. In recent years Föllings (1934) has described a more serious condition known as phenylketonuria in which the urine contains phenylpyruvic acid which is the product of oxidative deamination of phenylalanine, and which the patients cannot oxidise further.

Every individual with phenylketonuria so far examined has been mentally deficient, though there have been great variations in the degree of mental impairment. Here is a metabolic disease associated with mental defect, and Penrose's (1935a and b) work makes it very probable that this is due to a recessive gene.

The analogy of the kidney still holds in this case. People with one kidney are presumably more liable than ordinary people to renal disease. Penrose finds that a certain proportion of the carriers of the gene for phenylketonuria succumb to senile dementia. The gene for phenylketonuria can be regarded as the inactive form of a gene present in normal individuals, which is an intracellular organ concerned in intermediary metabolism, most probably in the further oxidation of phenylpyruvic acid. This normal gene generally has a factor of safety of two; in other words, one such gene will usually do the work of two, as will one kidney. But occasionally it is insufficient for its work in later life, and senile dementia results.

The metabolic function of normal genes and its failure in the case of certain human recessives were first clearly pointed out by Garrod (1909). In man, however, we cannot use certain experimental methods in the study of intermediary metabolism. In plants we can reach more exact results. For example, we can point to a gene in the wild type of sweet pea responsible for the methylation of two hydroxyl groups in a particular ring of the anthocyan molecule. In the absence or inactivity of this gene the normal purple pigment is replaced by blue. Similarly, in the absence of a gene for oxidation, one of these hydroxyls is absent and we get a red flower in place of a purple. In men and animals our knowledge is rarely so exact.

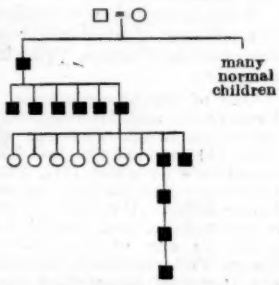

FIG. 4—Pedigree of leontiasis hystrix, after Cockayne.

SEX-LINKED INHERITANCE

A woman has 24 equal pairs of chromosomes, and a man 23 equal pairs and 1 unequal pair called X and Y. A woman has a pair of X chromosomes. A man produces two kinds of spermatozoa, carrying an X and a Y, in roughly equal quantities, the former giving rise to daughters, the latter to sons. If a gene is carried by the Y chromosome it is transmitted to sons and not to daughters.

The Lambert family, whose pedigree is shown in Fig. 4, suffered from a complaint which has been called leontiasis hystrix and other names. They had a scaly coat, which they moulted once or twice yearly. This fantastic pedigree was compiled by Cockayne (1933) and is based on the evidence of dozens of people, including several first-rate physicians and biologists, for a period of more than a century. It is, however, well known that abnormality thus inherited is rare.

Occasionally we find an abnormal dominant gene in an X chromosome. Fig. 5 (after Bampton

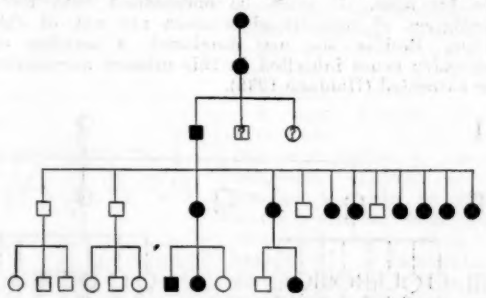

FIG. 5—Pedigree of dental abnormality, after Bampton.

1914 and Haldane 1937) is a pedigree of dental abnormality, including discoloration and faulty enamel. It was handed through two women to a man. As the man received it from his mother in an X chromosome he handed it on to all his seven daughters, and he handed on his normal Y chromosome to all his four sons. The daughters having received it in an X chromosome could hand it on to either sons or daughters.

Colour-blindness of either of the common types is an abnormality occurring in males and transmitted

through apparently normal females. A colour-blind man has an abnormal X and a normal Y chromosome. The abnormal X is handed down to all his daughters and none of his sons. The daughters are generally normal, since they have received a normal X from their mothers, and colour-blindness is recessive. But they transmit the abnormal X to half their sons, who are colour-blind, and half their daughters, who continue the transmission.

A far more serious condition is hæmophilia. Fig. 6 is a pedigree of particular interest, since it shows the descendants of Queen Victoria who suffered from this condition.

One of the Queen's sons, Prince Leopold, was a hæmophilic and transmitted the disease to one or two of his daughter's sons. One daughter's daughter (III, 14) married the last Tsar of Russia; another daughter's daughter (III, 24) married the last King of Spain; and the heirs apparent in both cases were hæmophilics. But King Edward VII (II, 2) was not a hæmophilic, and cannot have transmitted hæmophilia to any of his descendants. The fact that Queen Victoria was a heterozygote, or carrier, does not therefore imply that there is any trace of the disease in the present British royal family.

When I attempted to trace the pedigree further (Haldane 1938) I could find no trace whatever of hæmophilia among Queen Victoria's ancestors or collaterals, and it probably owed its origin in her to a mutation, something which we are at present unable to explain, at least in detail.

PARTIAL SEX-LINKAGE

Finally we have the incompletely, or partially, sex-linked congenital diseases. The X and Y chromosomes seem to have a portion which is homologous and which may be exchanged between them. Fig. 7 shows Snell's (1903) pedigree of retinitis pigmentosa. At first sight it appears to be due to an autosomal dominant. However, it will be seen that a man inheriting the disease from his mother transmits it predominantly to his daughters, though occasionally, as a result of exchange between X and Y chromosomes, a son may be affected or a daughter may fail to be so. Similarly, a man inheriting from his father transmits predominantly to his sons. It must be emphasised that most pedigrees of retinitis pigmentosa are not of this type. Besides the one dominant, a number of recessive genes inherited in this manner are known or suspected (Haldane 1936).

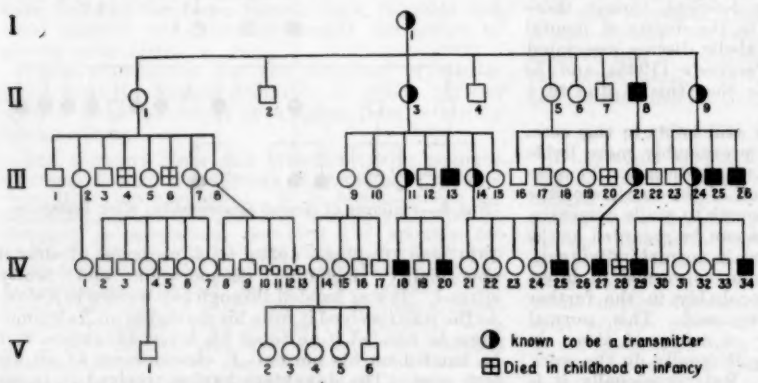

FIG. 6—Pedigree of hæmophilia. I, 1 was Queen Victoria, II, 2 King Edward VII, while IV, 25 and IV, 29 represent the last Tsarevitch and Prince of Asturias respectively. If III, 4 and III, 6 (brother of ex-Kaiser Wilhelm II) died of hæmophilia, as is possible, then II, 1 (Empress of Germany) was also a transmitter.

IRREGULAR INHERITANCE

The conditions which I have so far described are those which the geneticist finds easiest to deal with, but we must now consider some less simple cases. Fig. 8 is a pedigree in which blue sclerotics result

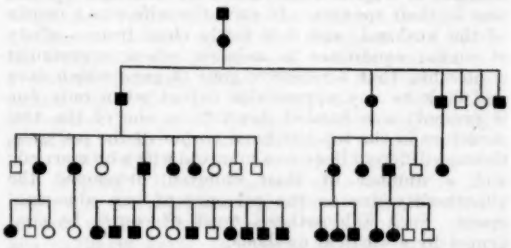

FIG. 7—Pedigree of retinitis pigmentosa, after Snell. Owing to partial sex-linkage 12 out of 16 affected children of affected men were of the same sex as their affected grandparents, and 7 out of 10 normal children were of the same sex as the unaffected grandparent.

from an autosomal dominant gene. This condition in itself is quite harmless. But some of the individuals with blue sclerotics have a history of multiple fractures, and some have a history of otosclerosis leading to severe deafness. The transmission of blue sclerotics is straightforward enough. But we have no idea why certain individuals with this abnormality should manifest bone fragility and others otosclerosis, or even both conditions. This is probably a medical rather than a genetical problem.

A pedigree of acholuric jaundice is shown in Fig. 9. It will be seen that the disease skips a generation on two occasions. Apparently normal people transmit it from their parents to their children. Campbell and Warner (1926) showed that both the jaundiced and the apparently normal transmitters have red blood corpuscles of an abnormal size and shape and peculiarly liable to hæmolysis in hypotonic saline. But why some but not all people with fragile corpuscles develop jaundice is once again a problem for the physician.

Here we can base our theory on definite physical signs of the diathesis, but there are many cases where a disease or abnormality "runs in a family" and we cannot say whether a given individual, apparently normal, will or will not transmit it to a proportion of his children. Other fairly well-marked dominants, such as Huntington's chorea, may not develop until the end of the reproductive period, by which time a number of children destined to suffer from the disease may have been brought into the world.

One great difficulty is that very similar abnormalities may be due to a number of different genes. Retinitis pigmentosa would seem to be an end-product of various abnormal processes. In some pedigrees it is caused by autosomal or by partially sex-linked dominant genes. There is an autosomal recessive

form of it associated with deafness, a partially sex-linked recessive form without deafness, and finally a completely sex-linked form without deafness. So that we are presumably grouping together under the term retinitis pigmentosa the results of a large number of different morbid processes. The same difficulty arises in animals. Deafness and abnormal head movements are seen in at least four different lines of mice, and in every case the abnormality is due to an autosomal recessive gene. We know that the four recessive genes are different because unions between any two lines give rise to normal or nearly normal mice. An investigation by Dr. C. S. Hallpike of the Middlesex Hospital and my colleague Dr. Grüneberg shows that, although these abnormalities are sometimes very similar in their symptoms, they have very different anatomical bases.

Evidence from animal experiments suggests that such conditions as anencephaly and spina bifida may sometimes at least be due to rearrangements of the chromosomes. If this is so, certain apparently normal individuals are liable to have a small fraction of children with these gross neural abnormalities and to pass on their liability to about half their normal progeny.

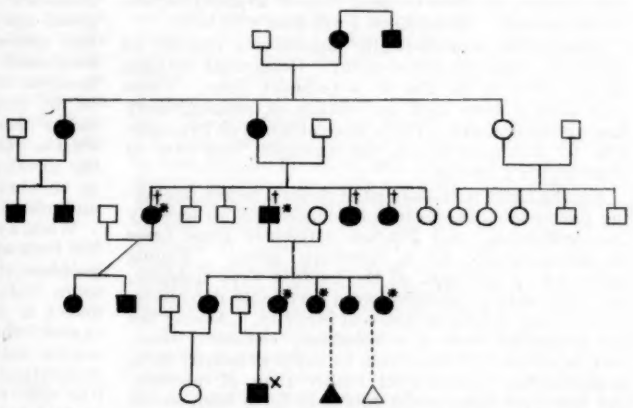

FIG. 8—Pedigree of blue sclerotics and associated diseases, after Coulon. * = fractures; † = deaf; × = congenital heart disease.

MENTAL DEFICIENCY

Finally we have characters whose inheritance is like that of stature, probably due to the interaction of numerous genes, each by itself having a slight effect. Such characters can at present only be investigated by statistical methods such as were developed by the late Karl Pearson.

The general nature of the problem can be seen by considering the genetics of mental deficiency, which is the end-result of a great many morbid processes, known and unknown. Table I is an analysis of Penrose's (1938) findings in 1280 consecutive cases. The first column gives the diagnosis, or at least an account of associated physical defects. Columns 3 and 4 show the percentage of parents considered to be mentally defective (as nearly half the parents would be in a disease due to a dominant gene), and the percentage of consanguineous marriages among the parents (which is high where a disease is due to a recessive gene).

TABLE I—DIAGNOSIS AND GENETICS OF 1280 MENTAL DEFECTIVES (PENROSE)

Diagnosis	Per cent.	M.D. parents (per cent.)	Related parents (per cent.)
Syphilis.. ..	3·9	6·0	0·0
Trauma.. ..	1·9	0·0	0·0
Inflammation ..	1·6	7·1	0·0
Endocrine ..	6·9	5·1	3·4
Mongolism ..	4·9	1·6	1·6
Neurological ..	6·5	2·5	9·5
Skeletal.. ..	11·1	4·2	4·2
Epileptic ..	16·4	6·9	3·8
Miscellaneous ..	6·8	5·2	3·4
Psychopathic ..	15·9	6·4	3·4
Doubtful ..	24·1	14·6	2·9
Total ..	100·0	7·7	3·5

A small fraction—about 6 per cent. of the whole—can be explained as due to congenital syphilis or to trauma at birth or afterwards. Another small fraction can be explained as the result of inflammatory disease, encephalitis, or meningitis. The high proportion of mental defectives among the parents, though only due to three individuals, suggests that some of these children were congenitally abnormal and that inflammation pushed them over the border of deficiency. Of Penrose's cases, 7 per cent. were associated with cretinism, hyperthyroidism, and other endocrine dystrophies. In some a partially recessive

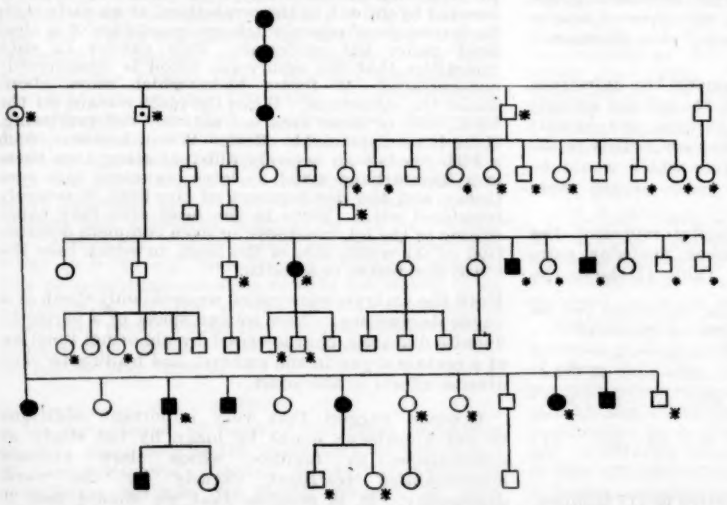

FIG. 9—Pedigree of acholuric jaundice, after Campbell and Warner. The individuals whose symbols are marked with a central dot had fragile corpuscles but no jaundice. * = examined.

gene seems to have caused milder hypothyroidism in the parents. Mongolism I will deal with later.

Among the neurologically abnormal a number of relatively rare recessives occur. Congenital diplegia seems often to be due to a recessive gene. There was thus a very high percentage of consanguinity among the parents. There were also one or two cases due to dominant genes, for example, one case of Huntington's chorea.

Among those with associated skeletal defect (including microcephalics) there is evidence both of heredity and inbreeding, and Penrose attributes some cases of microcephaly to a recessive gene. Among epileptics 16 per cent. of the parents were epileptic, although only a minority were certifiable defectives. Here is very strong evidence of heredity. Among the psychopathics there is a hereditary element. However, a number of them seem to suffer primarily from abnormalities of character rather than of intellect, and many of these could probably have been saved by psychiatric treatment during childhood.

I would ask you to notice the very high frequency of mental defectives among the parents of the residual population, those defectives who show no obvious physical or temperamental abnormalities. They differ from the rest in other respects. The degree of mental defect is generally milder, and only 5 per cent. were so severely defective as to be graded as idiots. Besides the 15 per cent. of their parents who were judged to be feeble-minded or worse, a very large proportion were extremely dull.

We are probably here dealing with the "tail" of a normal curve of distribution, like that of statures. The heights of adults in a population, save for a very few dwarfs and acromegalics, are distributed about a mean according to Laplace and Gauss's law, the distribution being continuous. Stature is inherited according to statistical laws which are explicable if it is determined by a considerable number of genes, each with a slight effect. A sufficiently large number may cause stature so low as to be regarded as abnormal, but no single one of the genes found in a very short person can by itself be described as pathological. Several other kinds of dwarfism, such as achondroplasia, seem to be due to single abnormal genes. These are to be compared with the types of mental defect due to single genes—e.g., phenylketonuria or epiloia.

The small number of idiots among the defectives, and the large number of stupid though not actually defective people among their parents, are exactly what would be expected on this view. This is the only category of mental defectives which would be markedly reduced if all the feeble-minded were segregated or sterilised.

The so-called mongolian imbeciles represent the survivors of a much larger number, probably more than one per thousand births. Table II shows the

TABLE II—ANALYSIS OF 217 FAMILIES, INCLUDING ONE OR MORE MONGOLIAN IMBECILES (AFTER PENROSE)

Mother's age	17–19	20–24	25–29	30–34	35–39	40–44	45–48	Total
Total births	13	128	213	255	234	151	37	1031
Per cent. mongols	23	10	6	11	27	54	60	22

ages of the mothers when 1031 children in 217 families, each containing one or more "mongols," were born. Penrose's (1934) work leaves little doubt that within a given family the chief factor determining the incidence of mongolism is maternal age. For a given age other factors such as the father's age and the number of previous pregnancies seem to be irrelevant. However, since the parents of different mongols are related more frequently than they should be by pure chance, there is certainly a genetical factor also behind mongolism. We are dealing here with a question which may ultimately be solved by the development of prenatal hygiene, one in which, as an obstetric physician, Dr. Lloyd Roberts would undoubtedly have been interested.

When a sufficiently satisfactory differential diagnosis has been applied to mental defectives, we see that the problem of mental defect is not a single problem any more than is that of fever or blindness. Mental defect is due to a very large number of different causes, the majority probably being matters of nature rather than of nurture; but for a proper understanding, the various types of mental defect, like different types of fever or blindness, must be studied independently.

DIATHESIS

I would call attention to the need for studying the nature of the diathesis in cases of irregular inheritance. As an example of what we may ultimately hope for in man I would mention the work done by Bonnevie (1933) and Plagens (1933) on a line of mice originally bred by Little, which showed irregular defects of the feet and eyes.

The feet were abnormal in a number of different ways: syndactyly was particularly common. The eyes were sometimes small or completely absent, or an eyelid might not open. In a general way this condition behaved as a recessive, like albinism: it disappeared on crossing with the normal, and reappeared in somewhat less than a quarter of the offspring when hybrids were bred together. But the abnormals did not breed quite true, always giving some normal progeny. In fact the whole affair was one of the scandals of mouse genetics, throwing doubt on the validity of Mendel's laws.

Bonnevie and Plagens found that among the progeny of abnormal parents every embryo was abnormal, even if it grew up into a normal mouse. The foramen anterius in the myelencephalon lying in front of the choroid plexus and subsequently covered by growth of the cerebellum, at an early state in development pours out large quantities of a clear fluid under the epidermis. This exudes in such quantities that the embryonic blood is considerably concentrated. It forms blebs which move about under the epidermis. When the blebs remain on the back, tail, or some area not actively differentiating, there is no appreciable effect. When, however, such a bleb reaches an actively differentiating area there is a hæmorrhage which is later organised into scar tissue, and the development of the limb is severely interfered with. Blebs in the head area may cause closing of the lid, blindness, or even complete destruction of the whole side of the head, in which case the fœtus dies before or at birth.

Until the embryo was studied we could only speak of a vague degeneracy. Now we can speak of a perfectly definite diathesis, characterised by abnormal function of a certain organ in the embryo, and leading to very diverse effects in the adult.

I would suggest that very important additions to our knowledge might be made by the study of miscarriages in families which show obscure abnormalities described vaguely by the word degeneracy. It is possible that we should find a clue to processes whose end-results at present baffle us. That is what Dr. Grüneberg is trying to do with mice at University College.

The study of animal genetics from this point of view should be regarded as an important branch of experimental medicine. In England two years ago there were two professors and one practical course in genetics; now there is one professor and no practical course. If, as I hope, genetics is to become part of the training of the medical student, there should be some endowment of the subject in our universities.

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SIGNIFICANCE OF THE VAN DEN BERGH REACTION IN DIAGNOSIS OF PERNICIOUS ANÆMIA

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AN abnormally high concentration of bilirubin in the serum has long been regarded as diagnostically significant in pernicious anæmia. We have not considered a case as typical unless it showed a low erythrocyte count, high colour-index, macrocytosis, poikilocytosis, complete achylia, a high indirect van den Bergh reaction in the serum, and a good reticulocyte response to liver therapy. We have regarded the normal serum bilirubin concentration as 0·2 to 0·4 mg. per 100 c.cm. It was therefore disturbing to find that Vaughan and Haslewood (1938) could not demonstrate any abnormality in the bilirubin content of the heparinised plasma of patients with pernicious anæmia and obtained a distribution curve indicating that 93 per cent. of clinically normal persons had a plasma bilirubin of 0·2 to 0·8 mg. per 100 c.cm. The mean normal value was 0·539 ± 0·025 mg. bilirubin per 100 c.cm. plasma. The present communication records the results of an investigation of the serum bilirubin content of "normal" persons, untreated patients with pernicious anæmia, and patients with pernicious anæmia controlled by liver therapy.

METHODS

We have found 85 cases of untreated pernicious anæmia diagnosed in the laboratory of the Royal Berkshire Hospital, Reading, since 1931. Without considering the van den Bergh reaction, all cases which did not fulfil the requirements stated above have been eliminated. The method of Haslewood and King (1937) has been used in this laboratory for the determination of serum bilirubin for about a year and has been completely satisfactory. Of the 85 cases 11 were diagnosed during this period; the remaining estimations were done by the method of McNee (1923). Results by the two methods are statistically comparable, but McNee's method is less convenient, and the standard is not nearly so satisfactory. It has been customary in this hospital to express results in van den Bergh units, and by direct comparison of figures obtained by both methods, their appropriate standard solutions being used, it has been found that in our hands 1 mg. bilirubin per 100 c.cm. by the method of Haslewood and King was equivalent to 2·04 van den Bergh units as determined by McNee's method. Van den Bergh units have accordingly been converted into milligrammes by the use of this factor.

To compare the results from sera of patients with pernicious anæmia with those obtained from a normal population, we determined the serum bilirubin of 64 apparently normal persons and of 21 patients with gonorrhœa. The admissibility of the latter group will be discussed later. The "normal" persons were medical practitioners, members of the hospital and laboratory staffs, and blood donors. The "normal" and "gonorrhœa" groups were in no way selected, and the serum bilirubin was in every case determined by the method of Haslewood and King. About 80 per cent. of the "normal" group consisted of males, and the "gonorrhœa" group was wholly male.

Precautions necessary in technique.—The low values of serum bilirubin observed in normal persons made it necessary to guard against slight errors, which would have made little difference to results obtained from icteric sera. Four standard solutions were used, equivalent to 0·2, 0·4, 0·8, and 1·6 mg. bilirubin per 100 c.cm., and the best match was selected for colorimetry. The van den Bergh reagent was discarded one hour after preparation, because weak colours prepared with older reagent rapidly became brown. This change occurred with very weak colours even with fresh reagent, so the time for colour development was limited to two minutes. The colour obtained in a strongly positive van den Bergh reaction hardly decreased in intensity, nor did it change in shade, during twenty-four hours, but the pale colours given by normal sera often changed to a brownish colour within thirty minutes. This change did not, however, appear seriously to affect the reading of the colorimeter, on which a green screen was used. Without the screen an over-compensation for slight colour differences occurred causing the result without the screen to be about 0·03 mg. bilirubin per 100 c.cm. serum below that obtained with the screen.

RESULTS

"Normal" sera.—Table I shows that among the 64 "normal" persons 58 (91 per cent.) had serum bilirubin between 0·1 and 0·4 mg. per 100 c.cm. The mean value was 0·34 mg. per 100 c.cm., with a standard deviation of ± 0·16 mg.

Patients with gonorrhœa.—Table I shows that patients with gonorrhœa had a normal distribution of serum bilirubin. The mean value was 0·28 mg. per 100 c.cm. serum, with a standard deviation of ± 0·11 mg. This result was considered sufficient justification for combining the above two populations and considering them as "normal" from the point of view of serum bilirubin. This was done reluctantly but was necessitated by lack of further suitable normal donors. Owing to pressure of routine it was impossible to carry out blood counts and complete physical examinations on all our "normal" persons

but we feel that this cannot greatly affect the validity of our conclusions.

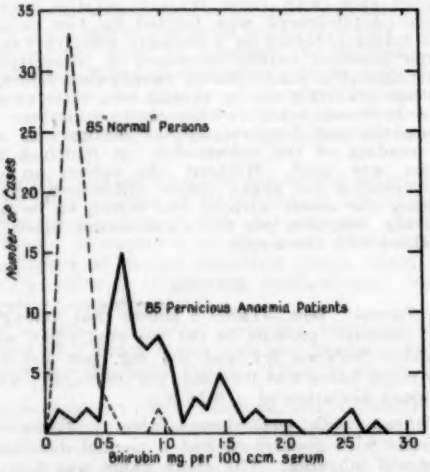
Combined "normal" sera.—Of the 85 persons considered normal for the purpose of this paper 77 (91 per cent.) had between 0·1 and 0·4 mg. bilirubin per 100 c.cm. serum, and the mean value was 0·31 mg. per 100 c.cm., with a standard deviation of 0·15 mg. These results are set out in full in Table I.

TABLE I—DISTRIBUTION OF BILIRUBIN CONCENTRATION IN SERUM OF 64 NORMAL PERSONS AND 21 GONORRHŒA PATIENTS

Bilirubin mg. per 100 c.cm. serum	Normal persons	Gonorrhœa patients	Total
0 –0·1	2	2	4
0·1–0·2	13	6	19
0·2–0·3	24	9	33
0·3–0·4	19	2	21
0·4–0·5	2	2	4
0·5–0·6	2	0	2
0·6–0·7	0	0	0
0·7–0·8	0	0	0
0·8–0·9	0	0	0
0·9–1·0	2	0	2
1·0–1·1	0	0	0

TABLE II—DISTRIBUTION OF BILIRUBIN CONCENTRATION IN SERUM OF 85 PATIENTS WITH PERNICIOUS ANÆMIA

Bilirubin mg. per 100 c.cm. serum	Cases	Bilirubin mg. per 100 c.cm. serum	Cases
0 –0·2	2	1·5–1·6	3
0·2–0·3	1	1·6–1·7	1
0·3–0·4	2	1·7–1·8	2
0·4–0·5	1	1·8–1·9	1
0·5–0·6	10	1·9–2·0	1
0·6–0·7	15	2·0–2·1	1
0·7–0·8	8	2·1–2·2	0
0·8–0·9	7	2·2–2·3	0
0·9–1·0	8	2·3–2·4	0
1·0–1·1	6	2·4–2·5	1
1·1–1·2	1	2·5–2·6	2
1·2–1·3	3	2·6–2·7	0
1·3–1·4	2	2·7–2·8	1
1·4–1·5	6		



Distribution of bilirubin concentration in sera of 85 "normal" persons and 85 patients with pernicious anæmia.

Patients with pernicious anæmia.—The records of 85 cases of pernicious anæmia have given the distribution of serum bilirubin shown in Table II. The data, together with those of the "normal" persons taken from Table I, are illustrated in the Figure, in which the difference between the two distribution curves is apparent. Not only do the peaks occur at different points, but the shapes of the two curves are quite different. Of the 85 pernicious anæmia patients 79 (93 per cent.) had a serum bilirubin greater than 0·4 mg. per 100 c.cm., and the mean value was 0·98 mg., with a standard deviation of 0·54 mg. Only 8 (9 per cent.) of the "normal" individuals had more than 0·4 mg. bilirubin per 100 c.cm. serum, and the mean value was 0·31 mg., with a standard deviation of 0·15 mg.

To check the comparability of results calculated from determinations by McNee's method and those by that of Haslewood and King the mean and standard deviation of the pernicious anæmia cases investigated by the latter method have been calculated. Table III shows these results. The arithmetic mean was 0·95 ± 0·035 mg. bilirubin per 100 c.cm., whereas that of the results obtained with McNee's method was 0·94 ± 0·066 mg. The correspondence between these figures tends to confirm the claim that the two sets of data are statistically comparable.

TABLE III—ERYTHROCYTE COUNT AND BILIRUBIN CONCENTRATION IN SERUM OF 11 UNTREATED PATIENTS WITH PERNICIOUS ANÆMIA (VAN DEN BERGH REACTION BY METHOD OF HASLEWOOD AND KING)

Case	Bilirubin mg. per 100 c.cm. serum	Erythrocyte count
1	1·40	1,800,000
2	1·75	900,000
3	0·60	1,500,000
4	0·90	1,200,000
5	0·60	2,600,000
6	0·65	2,700,000
7	1·40	1,900,000
8	0·70	1,800,000
9	0·90	3,400,000
10	0·80	1,200,000
11	0·75	1,500,000

Constants calculated from the data in the foregoing tables are assembled in Table IV. The fact that the difference between the mean of the serum bilirubin of the "normal" group and that of the pernicious anæmia patients is more than ten times as great as the standard error of the difference between the means (± 0·061 mg.) indicates that in this respect the two populations are significantly different. This conclusion depends on the assumption that the two groups are fair samples of their respective populations, and the exigencies of laboratory routine and the limited supply of normal donors have resulted in the "normal" group not being perfect from this point of view. We feel, however, that a strictly normal group would have given results not materially different from our composite "normal" group, and we can only conclude that in our hands the level of serum bilirubin is higher in untreated pernicious anæmia patients than in normal persons.

TABLE IV—CONSTANTS CALCULATED FROM BILIRUBIN CONCENTRATION IN SERUM OF "NORMAL" AND PERNICIOUS ANÆMIA PATIENTS (MG. PER 100 C.CM.)

—	"Normal"	Pernicious anæmia patients—	
		Untreated	Treated
Arithmetic mean ..	0·31 ± 0·016	0·98 ± 0·059	0·31 ± 0·026
Standard deviation	± 0·15	± 0·54	± 0·19
Coefficient of variation	48 per cent.	55 per cent.	61 per cent.

Decrease in serum bilirubin after treatment of pernicious anæmia by liver therapy.—This conclusion receives further support from the observation that, after suitable treatment with liver preparations (Campolon, Examen, and anahæmin), the serum bilirubin of pernicious anæmia patients returns to a normal level. Of our pernicious anæmia patients 53 have submitted to determination of serum bilirubin by the method of Haslewood and King while under treatment and having a normal erythrocyte count. All but 3 of these patients also occur in the group of untreated cases. The results are reported in Table V. It will be seen that the distribution resembles that of the normal group, the mean value being 0·31 mg. bilirubin per 100 c.cm. serum, with a standard deviation of ± 0·19 mg. This value is not significantly different from that obtained for normal persons and differs very greatly from the pernicious anæmia figure.

TABLE V—DISTRIBUTION OF BILIRUBIN CONCENTRATION IN SERUM OF 53 TREATED PATIENTS WITH PERNICIOUS ANÆMIA

Bilirubin mg. per 100 c.cm. serum	Cases	Bilirubin mg. per 100 c.cm. serum	Cases
0 –0·2	19	0·6–0·7	1
0·2–0·3	13	0·7–0·8	1
0·3–0·4	11	0·8–0·9	0
0·4–0·5	5	0·9–1·0	2
0·5–0·6	1	1·0–1·1	0

DISCUSSION

Vaughan and Haslewood (1938) described a distribution of bilirubin in normal plasma which was so wide that in every case of pernicious anæmia except one the figure obtained could be matched by that from a normal person. Our experience suggests that this is true, for, although in the consecutive series of "normals" reported in this communication we did not obtain a result above 1·0 mg. bilirubin per 100 c.cm. serum, a case is known to us in which an otherwise apparently normal young man has a serum bilirubin ranging from 1·8 to 3·0 mg. The latter figure is at the upper limit of the pernicious anæmia results which we have reported. However, it is felt that the impression has been given that the van den Bergh reaction has little or no significance in pernicious anæmia, and this paper has been written with the object of preventing this misinterpretation of the facts.

The Figure shows that only 7 per cent. of our pernicious anæmia patients had a serum bilirubin less than 0·4 mg. per 100 c.cm., whereas 91 per cent. of our "normal" group gave a result lower than 0·4 mg. There is, therefore, a very striking difference between the two groups, which is further emphasised by the great difference in the two distribution curves. Normal persons sometimes have a serum bilirubin greater than 0·4 mg. per 100 c.cm., and patients with pernicious anæmia occasionally have less, but such events are so rare that in our hands the van den Bergh reaction has high diagnostic significance.

The most striking proof that a significant difference between the two populations does in fact exist is demonstrable not by statistical analysis but by the fact that specific treatment of pernicious anæmia causes a return of a previously raised serum bilirubin to a normal level. Space does not permit publication of detailed figures for each patient, but the distribution shown in Table V makes it clear that such a return to normal does, in fact, take place. This observation can only mean that a raised serum bilirubin is a true symptom of pernicious anæmia.

SUMMARY

(1) The bilirubin content of the serum of pernicious anæmia patients was found to be considerably greater than that of normal persons. (2) In each group 85 persons were investigated. Of the pernicious anæmia patients 93 per cent. had serum bilirubin greater than 0·4 mg. per 100 c.cm., whereas of the normal patients 91 per cent. had less than 0·4 mg. per 100 c.cm. (3) The serum bilirubin was 0·31 ± 0·02 mg. per 100 c.cm. in normal persons and 0·98 ± 0·06 mg. per 100 c.cm. in pernicious anæmia patients. (4) In 53 cases of pernicious anæmia controlled by liver therapy the serum bilirubin was 0·31 ± 0·03 mg. per 100 c.cm. Specific treatment is therefore shown to reduce the raised serum bilirubin to normal levels.

We wish to express our gratitude to those who acted as blood donors for this work, to acknowledge the assistance of Mr. S. B. Elcoate in the estimation of bilirubin, and to thank the physicians of the Royal Berkshire Hospital for access to clinical material and Drs. Vaughan and Haslewood for their helpful criticism of our results.

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CONTROL OF URINARY SECRETION BY THE ANTERIOR PITUITARY

BY B. G. SHAPIRO, M.A., Ph.D., M.B. Capetown
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THE part played by the posterior pituitary and its hypothalamic connexions in the control of water metabolism is well established. The view that the anterior lobe may also be concerned in this mechanism has not received adequate recognition, but evidence, based on animal experiments, is accumulating to support it.

Teel (1929) induced polyuria in normal dogs by injection of extracts of the anterior pituitary containing the growth principle. Barnes et al. (1933) consider the polyuria following injection of anterior-lobe extracts to be due to the thyrotropic hormone, since it was produced by them in normal but not in thyroidectomised dogs. Biasotti (1934) also believes the thyrotropic hormone to be mainly concerned. Gaebler (1935), on the other hand, reports polyuria following injection of the growth hormone in thyroidectomised dogs.

The effect of hypophysectomy on water metabolism has also been investigated. Removal of the posterior lobe is known to cause diabetes insipidus, but Richter (1934), working on rats, and Ingram and Fisher (1936), using cats, have found that, if the anterior lobe is completely removed at the same time, the diabetes does not persist. These observations support the evidence obtained by injection, that the anterior lobe exerts an influence in a diuretic direction. Dodds et al. (1937), however, working on rats, could not confirm these findings.

To investigate the problem in man it was decided to determine the effect of (1) depressing the activity of the anterior lobe by injection of large doses of œstrin, and (2) injecting anterior-lobe extracts. It has been shown that œstrin in large doses can depress the activity of the anterior lobe of the pituitary.

Thus an inhibitory effect has been demonstrated (*a*) on the gonadotropic hormone in the rat by numerous workers and in man by Frank and Salmon (1935) and by Jones and MacGregor (1936); (*b*) on the thyrotropic hormone by Heyl et al. (1934), and Franck (1937); (*c*) on the growth hormone by Zondek (1936); and (*d*) on the diabetogenic hormone in monkeys by Nelson and Overholser (1936). Using urinary creatinine estimations as an index of anterior-pituitary activity, I have observed diminished creatinine excretion when high doses of œstrin are injected in women. This work is being reported elsewhere.

If the anterior lobe functions in a diuretic direction, injections of œstrin in doses large enough to depress the anterior pituitary should cause reduction of urinary output. This supposition is substantiated in a preliminary report on the influence of œstrin on urinary secretion (Shapiro 1938). Thorn et al. (1938) have subsequently reported a slight but significant retention of water in the middle of the intermenstrual and in the premenstrual phases of the human menstrual cycle, which coincide with the periods of maximal excretion of œstrin. Similarly Krohn and Zuckerman (1937) report that in many primate species there is a cyclical retention of water related to phases of œstrogenic stimulation.

Method of investigation.—Most of the subjects receiving small doses of œstrin were suffering from dysmenorrhœa or oligomenorrhœa, whereas those to whom œstradiol benzoate in doses of 5 mg. or more was administered were cases of amenorrhœa or women past the menopause. Patients whose urinary output was normally less than 1000 c.cm. daily were not included in this investigation. Both the level of fluid intake and the diet were maintained as constant as possible throughout the experiment. Such variations in temperature as might affect the volume of urine excreted were noted. To establish the normal level of urinary output in each case urine was collected over as long a period as circumstances permitted before injections were begun, and the output of normal individuals under similar conditions was observed over long periods.

DEPRESSION OF ANTERIOR-PITUITARY ACTIVITY IN PATIENTS WITH NORMAL URINARY OUTPUT

Small doses of œstrin were administered to 14 patients. Oral administration of œstrone in doses ranging from 0·1 to 1 mg. daily for fourteen days failed to produce an alteration in urinary volume. Injections of œstrone in doses of 0·1–1 mg. given daily for fourteen days had no effect, nor did courses of œstradiol benzoate consisting of five injections of 5 mg. given over a period of fourteen days.

Large doses of œstrin were administered to 16 patients in courses of five or more daily injections of œstradiol benzoate 10 mg. A significant decrease of urinary output was observed on twelve occasions, usually developing after the second or third injection. On cessation of injections the output returned, sometimes immediately and sometimes after many days, to the normal. Subsequently an increased urinary output was observed, the degree of polyuria being greater than could be accounted for simply by a release of retained fluid. During the phase of diminished output the volume sometimes fell to 50 or even 30 per cent. of the lower normal level for the individual, whereas subsequently it often rose to 100 per cent. above the normal maximal daily output. After cessation of injections patients often reported a frequency of micturition even on days when there was no polyuria. An attempt was made to investigate variation of weight in several patients, but no significant results were obtained.

Fig. 1 is a record of the urinary output over a period of three months in a woman aged 28 with secondary amenorrhœa. After injections of œstradiol benzoate 10 mg. given daily for six days the urinary output decreased so much that it amounted only to 340 c.cm., 400 c.cm., 360 c.cm., and 220 c.cm. on successive days. This oliguria was not accompanied by any impairment in general health or by the presence of any abnormal constituents in the urine. It was succeeded by the phase of increased urinary excretion, during which œstradiol benzoate 25 mg. was injected on three successive days. Again a period of diminished urinary output resulted and was followed by a fluctuating polyuria.

The other cases in this group, including a female castrate, behaved in a similar manner. On the other hand, in a case of basophil adenoma in which the pituitary fossa had been explored and implanted with radon seeds, oliguria did not result from the administration of œstrin. (The history and effects of operation in this case were reported by Pattison and Swan in 1938.) This supports the view that œstrin influences the urinary output via the pituitary.

DEPRESSION OF ANTERIOR-PITUITARY OUTPUT IN DIABETES INSIPIDUS

The effect of œstrin in diabetes insipidus was investigated to see if the same mechanism pertained as in patients with a normal urinary output. Two cases were obtained.

The first patient, a girl of 16, was given five daily injections totalling 37·5 mg. of œstradiol benzoate. Before injection her daily output ranged from 3700 c.cm. to 4400 c.cm. During the injection period it varied between 2200 c.cm. and 3600 c.cm., returning afterwards to the original level and rising from the fourth to the eleventh day after the last injection to 4700–6700 c.cm. Fig. 2 shows the average output for each phase.

The second patient was a boy of 4½ years. Œstradiol benzoate 5 mg. injected daily for five days resulted

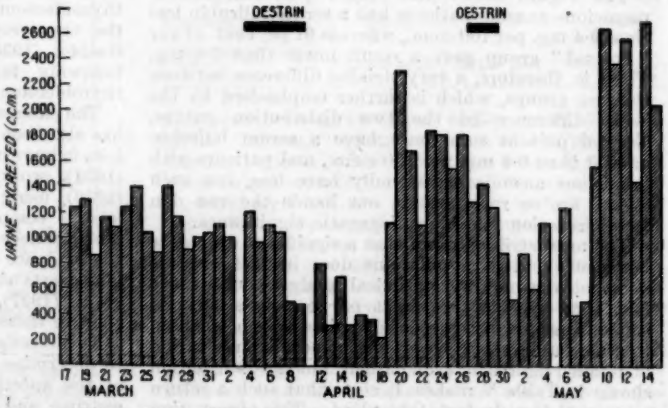

FIG. 1—Effect of œstradiol benzoate on urinary output of a woman aged 28 with secondary amenorrhœa. Dose from March 4th–9th, 10 mg. daily; from April 27th–30th, 25 mg. daily.

in a fluctuating diminution of output, the lowest level reached being 40 per cent. of the minimal pre-injection level.

INJECTION OF ANTERIOR-PITUITARY PREPARATIONS

Four patients received Antuitrin (Parke, Davis), which contains a mixture of anterior-pituitary hormones. Four patients received Antuitrin Growth (Parke, Davis). Three patients received Pregnyl (Organon), which is obtained from urine of pregnancy and contains gonadotropic (mainly luteinising) hormone.

Both antuitrin and antuitrin G, when given in doses of 4–5 c.cm. daily for 3–5 days, increased the urinary output. In some cases the increase was only 30 per cent. above the normal maximum, whereas in others it was 100 per cent. or more. On one occasion it reached 280 per cent. above the normal maximum. Antuitrin not being standardised, there may be considerable variation in the potency of different samples. Pregnancy urine extracts had no effect in the doses given, 1000 R.U. daily for three

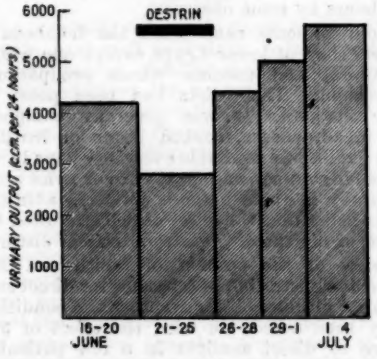

FIG. 2—Effect of œstradiol benzoate on urinary output of a girl aged 16 with diabetes insipidus. Total dose 32·5 mg.

days in a child and 500 R.U. three times a week for four weeks in two adults.

Fig. 3 shows the effect of antuitrin, antuitrin G, and gonadotropic hormone on a child aged 2 years and 8 months suffering from a form of muscular dystrophy. Ambinon, an anterior-lobe preparation containing 150 units of thyrotropic hormone and 50 units of gonadotropic hormone per c.cm., was injected in daily doses of 1 c.cm. over a period of six weeks into the patient, whose pituitary fossa had been explored. It produced during the period of treatment a fluctuating polyuria which, on one occasion, reached 3000 c.cm. in 24 hours. Her daily output before treatment averaged 950 c.cm. This increase is unlikely to be due simply to increased metabolic activity, for, whereas the injections restored her basal metabolic rate from 40 per cent. to normal, the urinary output rose to a level considerably above that of a normal person.

DISCUSSION

The "pituitary release" phenomenon in man.—Short intensive courses of œstrin led to a diminution followed by an increase of urinary output. This effect is analogous to the pituitary release phenomenon described by Clauberg and Breipohl (1935) in rats. They showed that cessation of a course of injections of large doses of œstrin which suppressed the

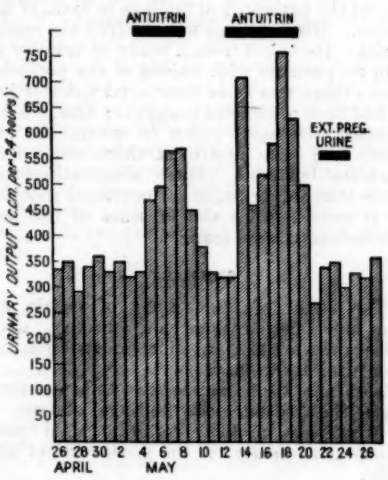

FIG. 3—Effect of antuitrin, antuitrin growth, and extract of pregnancy urine on urinary output of a child aged 2 years 8 months with muscular dystrophy. Doses: antuitrin growth (May 4th–8th), 21 c.cm.; antuitrin (May 13th–20th), 36 c.cm.; extract of pregnancy urine (May 22nd–24th), 1000 rat units daily.

gonadotropic function of the anterior lobe was followed by a sudden release of excessive gonadotropic activity. Bishop and Shapiro (1938) report a similar effect of œstrin in producing inhibition followed by stimulation of facial hair-growth in basophil adenoma of the pituitary.

Relation between anterior pituitary and urinary secretion.—The diuretic influence of anterior-pituitary extracts, together with the effect of œstrin on urinary excretion, provides evidence of control of urinary secretion in man by the anterior pituitary. The results obtained with anterior-pituitary preparations indicate that both the growth and the thyrotropic factors can increase the urinary output. No effect was obtained with extract of pregnancy urine, but the dosage used was not very high. The dose required to produce depression of urinary output is the same as the dose required to depress other metabolic functions of the anterior pituitary. Thus, using creatinine excretion as an index of anterior-pituitary activity, I have observed that daily injections of œstradiol benzoate 5–10 mg. are required to depress creatinine metabolism. Bishop and Shapiro (1938) have also found that it requires doses of a similar order to depress hypertension and hair-growth in cases of basophil adenoma of the pituitary.

The polyuria of Cushing's syndrome may possibly be due to anterior-lobe hyperactivity rather than to pressure of the tumour on the posterior lobe, because often there is no tumour at all, simply a hyaline change in the basophil cells (Crooke 1935). When a tumour is present it is always very small and situated in the anterior part of the anterior lobe, exerting no pressure at all on the posterior lobe.

Ætiology of diabetes insipidus.—While the anterior lobe is being inhibited by injection of large doses of œstrin in diabetes insipidus there is a decrease in the severity of the condition. During the subsequent phase of anterior-pituitary stimulation there is an aggravation of the diabetes insipidus. These facts fit in very well with the observations of von Hann

(1918) on the pathological findings in cases of diabetes insipidus. His work has not received the recognition it merits. He found from a study of autopsy records that in 20 patients with lesions of the posterior lobe in whom there was some functional anterior lobe left there had been a diabetes insipidus; but in 9 patients with much the same lesion in whom the anterior pituitary had been destroyed there was no history of diabetes insipidus. These observations provide evidence that the presence of functional anterior-lobe tissue is necessary for the presence of the polyuria of diabetes insipidus in man.

SUMMARY

(1) The effect of large doses of œstrin and of anterior-lobe preparations on urinary excretion provides evidence for a diuretic function of the anterior pituitary in man.

(2) The effect of œstrin in diabetes insipidus supports the pathological findings of von Hann (1918) that the presence of functional anterior-lobe tissue is necessary for the production of diabetes insipidus.

(3) It is suggested that the polyuria of Cushing's syndrome may be a manifestation of anterior-pituitary hyperactivity.

(4) The response of urinary excretion to œstrin is considered to provide evidence in man of the "pituitary release phenomenon" described by Clauberg and Breipohl (1935) in rats.

I wish to thank Drs. P. M. F. Bishop and A. C. Hampson for their encouragement and for their coöperation in providing cases from the endocrine clinic at Guy's Hospital for this investigation. I am also indebted to Dr. Bishop for valuable suggestions and criticism of the manuscript and to Dr. W. R. Spurrell for his helpful interest and for providing laboratory facilities. My thanks are due to Organon Ltd. for generous supplies of œstrogenic preparations and to Parke, Davis and Co. for supplies of Antuitrin and Antuitrin G. The expenses of this investigation were defrayed by a grant from the Medical Research Council.

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MEDICAL BROADCASTS.—At 10.45 A.M. on Dec. 30th a doctor will discuss the nation's health as it is reviewed in the annual report of the Ministry of Health for last year.

The "Mother and Doctor" series, in which a young mother discusses her problems with a doctor, will be continued in the New Year on Fridays at 10.45 A.M. During this quarter the talks will deal with the baby's health from about six months to five years.

TREATMENT OF PELLAGRA WITH NICOTINAMIDE

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BIOLOGICAL interest in nicotinamide is of recent date. In view of the large number of people with pellagra in Egypt we have, in an endeavour to confirm the results obtained by other workers, treated, during the last three months, 17 cases of this disease with nicotinamide. While we feel satisfied that it is the most effective treatment we have yet tried, we could not confirm the brilliant results obtained after only 24–48 hours by some observers.

All our patients came from the fellaheen (farm labourer) class of lower Egypt except one who came from Cairo, and another whose occupation was whitewashing. Their diets had been poor, except in one instance. It was generally composed of maize bread, cheese, cooked beans or lentils, and pickles; milk was available every few days in winter, less often in summer, and meat once or twice a month. Incidentally in these patients we were able to confirm our belief that the onset of pellagra often follows a period of diarrhœa or gastro-intestinal disturbance.

In view of the opinion of Smith and Ruffin[1] that the demonstration of tolerance for direct sunlight is essential in determining whether the condition has actually been cured, we tried the effect of 3 days' exposure to direct sunlight in a few patients. Of those who had no nicotinic acid, all suffered from an increase in redness and itching on the exposed surfaces, while none of those who were having the drug suffered, although all informed us that exposure previously caused sunburn.

The dose given was 1·0 g. nicotinamide by mouth or 0·5 g. by injection daily, except when otherwise stated. In later cases we had to reduce the parenteral dose owing to the prevalence of dizziness and throbbing in the head after injection. Five patients had nicotinic acid and the results with this drug are strictly comparable, except that these patients seemed to develop toxic symptoms much more often than those who had the "amide" preparation. No other treatment, local or otherwise, was used and even the diarrhœa was left untreated. During control periods the usual hospital diet was given. As soon as nicotinamide was begun, meat and milk were cut off and the patients put under strict dietetic observation.

CONTROLS

Although we knew from previous experience what may be expected from the dietetic treatment of pellagra, aided or unaided by Marmite, yeast, liver, or iron, and our results with nicotinamide were obviously superior, yet we kept, as controls, seven of our patients on ordinary hospital diet with marmite (30–40 g. a day). When they had shown no improvement after a time varying from 7 to 25 days, they were given nicotinamide. Case 6, who showed great

[1] Smith, D. T., and Ruffin, J. M., *Arch. intern. Med.* 1937, **59**, 631.

improvement on the marmite treatment, was not given the drug, but he cleared up only after 30 days. Actually one of the cases developed an ulcer on the tongue during the control period, and another (Case 8) also did so when the dosage was changed from 1·0 g. nicotinic acid by mouth to 0·3 g. nicotinamide by injection. Whenever nicotinamide was given the diet was reduced at the same time, meat and milk being stopped.

In two cases (2 and 5) with a previous history of pellagra, stomatitis developed while they were being treated in hospital on a full diet with vitamins A, C, and D in one case, and with parenteral vitamin B_1 in the other. The stomatitis was cured by nicotinamide, but Case 2 after having been out, without treatment, for 4 weeks came back to hospital with a pellagrous rash. In two other cases (4 and 10) nicotinamide was given in their own homes, after a period of observation in out-patients, and they were told to continue on the same pellagra-producing diet which they had been in the habit of taking; and to do their usual work.

RESULTS

Itching is usually relieved in 24–48 hours. Fissures of the skin heal in 2 or 3 days, redness and other acute inflammatory changes subside very rapidly. Peeling may start on the second or third day, but usually begins later, about the fifth, or as late as the seventh day, and is never complete in less than two or three weeks. Skin changes of the "chronic" type, or those in friction areas in which no signs of activity were present, were very slightly affected, if at all, even after a month's treatment (Cases 8 and 9). It is possible that these patients were not followed up for a sufficient length of time.

An interesting observation was made on the effects produced by scrubbing a pellagrous skin. Before treatment the thickened epidermis is partly removed by this means, and the skin underneath is found to be horny, dry, and rough, and quickly becomes recovered with scales. Usually a few days *after* treatment is begun, and before peeling has advanced, a good scrubbing will remove the thickened epidermis and leave thin, healthy, pliable skin underneath, which remains in this condition. The sulphur granules (sebaceous plugs) on the face disappeared very quickly in a few patients; in others very slowly, although the skin showed great improvement.

The acute inflammation and ulcers of the tongue subsided in from two to five days. The atrophied papillæ rarely regenerated and then only very slowly, but the creases of the mucosa did not disappear. In Case 7 the sense of taste returned after treatment. In Case 9, a boy with a severe stomatitis, however, nicotinic acid had no effect upon the appearance of the tongue although the burning sensation was relieved. In this patient violent colic followed each dose, suggesting the possibility of intolerance, or of an abnormal response, to the drug.

The appetite was greatly improved in all cases, but absent gastric acidity never reappeared. In one instance hyperacidity was reduced by the treatment. Heartburn, a burning sensation in the mouth and throat, dysphagia, and ptyalism quickly disappeared. Diarrhœa cleared up in Cases 3, 4, 5, 7, and 9 after all other treatment had failed, even when it was due to active bilharzial colitis and papillomata.

The patients felt much more cheerful, bright, and alert and in three cases the delusions and elation disappeared. One man, however, who was rather melancholic and always grumbling, showed no improvement in his mental or skin condition. In Case 8 an apparently persistent bilateral ankle-clonus disappeared under treatment.

In 4 cases (7, 8, 9, and 10) nicotinic acid was given for a varying period instead of nicotinamide. In these a general feeling of warmth, with flushing and itching of the skin, followed each dose of 1·0 g. and lasted for two hours each time. In Case 9 this was accompanied by severe epigastric pain and colic. On reducing the dose, or distributing it over the day, no ill effect was produced. The nicotinamide rarely produced such symptoms, and then only a transient headache.

CASE REPORTS

CASE 1.—A woman of 25 suffered from diarrhœa and dermatitis. Her lips were fissured at the commissures and there was leukoplakia on the lower lip. Her tongue was glazed with raw, angry fissures and leukoplakia and she complained of burning sensations in her mouth and throat. There was a typical pellagrous rash on her feet and on her hands which also had septic ulcers. She was slow mentally, but very highly emotional. Her appetite was poor and there was no free acid in the stomach. She had five motions daily. After 17 days on ordinary diet and iron, but no marmite, the symptoms were worse; nicotinamide was then given. Two days later her mind was clearer and she was much less emotional; the burning sensation had disappeared and peeling of the skin started. Her appetite rapidly returned and was even excessive. In 5 days the leukoplakia had disappeared, and the fissures on the lips and tongue had epithelialised, but the mucous membrane was still atrophic and creased. She was feeling quite cheerful and the skin condition had practically healed in two weeks.

CASE 2.—A whitewasher of 28 complained of chronic diarrhœa, spongy bleeding gums (showing deficiency in vitamin C), xerophthalmic patches and night blindness. For the last two years he had had in spring a pellagrous rash with sore-throat. On vitamins A, C, and D, and ordinary diet the gums, vision, and xerophthalmia slowly improved; but he developed stomatitis, with a red, dry, sore, and glazed mouth and tongue, and with also severe burning sensations and dysphagia. His gastric acidity was normal and there was no dermatitis on admission.

No local treatment was given but meat and milk were stopped and nicotinamide was administered. Two days later only the tip of the tongue and the margin of the soft palate were red. The tongue was covered with fur on the eighth day. He spent three days in the sun without any effect on his skin. The patient was discharged and resumed his previous mode of life. Four weeks later he came back with slight dermatitis on the neck and feet and complained of diarrhœa. He was kept for a week on hospital diet with no improvement. After 3 days on nicotinamide the skin had completely healed and he was passing only two motions a day.

CASE 3.—A boy of 11 had severe dysentery with incontinence for a year. He also had for the previous two months an eruption on his feet, hands, and neck, and fissures on his feet and hands. His parotid glands were also enlarged. Gastric acidity was normal but his appetite was poor. There was a big bilharzial papilloma in his rectum. His tongue was glazed. After a week on ordinary diet and treatment there was no improvement in the dermatitis or diarrhœa. All other treatment was stopped and nicotinamide was given. Three days later his appetite was ravenous and he tried to steal food from the other patients in the ward. On the seventh day the incontinence had stopped; 4 days later the diarrhœa also ceased; his skin was completely healed and he was discharged. The tongue, however, was unaffected by the treatment.

CASE 4.—A man of 50 had a rash for three months and diarrhœa for six weeks. Lately he had become excitable and was suffering from delusions and disorientation. His appetite was poor and free acid was absent. He had seven motions daily, but the rectal mucosa was normal. There was severe dermatitis of his hands, feet, and lips, with raw oozing fissures, and abundant sulphur granules on his face. He was treated with nicotinamide at his own home for 3 days and felt much fitter; his mental condition became stable and the rash improved. Treatment was then continued in hospital. In four more days the skin of the hands was peeling in large sheets and the fissures were covered with epithelium. On the tenth day only the appearances of chronic disease were present. Exposure to the sun had no effect on his skin. After 20 days only a few scales on the hands and a few sulphur granules on the face were left. The skin was thin and healthy and the diarrhœa had stopped.

CASE 5.—A man of 35 was admitted for chronic colitis and severe diarrhœa of two years' duration. He had a history of pellagrous dermatitis and stomatitis which started three months after the initial attack and recurred during the following summer. On admission there was no rash and no stomatitis. The sigmoidoscopic appearance suggested chronic bacillary dysentery or ulcerative colitis. No tubercle or dysentery bacilli were found in the stools. Free acid was absent. The patient was given 5 mg. vitamin B_1 by injection daily for two weeks, along with other treatment. A few weeks later he had a severe glossitis with a red, shiny, fissured tongue and a burning sensation in his throat and tongue. After 2 days on nicotinamide the burning sensation and the injection of the mouth and throat had disappeared and papillæ had grown on all but the tip and edges of the tongue.

CASE 6.—A man of 55 was treated with marmite and brewer's yeast only. He had had diarrhœa for four months and a rash for one month and had a similar history four years previously. His tongue was glazed with central and lateral creases and a small ulcer on the right side. The lips and commissures were rough and wrinkled. His acidity was normal. He had four stools a day and intestinal bilharziasis and ancylostomasis. There was a rash on his hands, feet, and neck. On full diet with 45 g. marmite daily a new ulcer appeared on the left side of the tongue. Marmite was stopped on the tenth day, and he was then given 250 g. brewer's yeast daily. After 20 days of this treatment the skin condition had greatly improved. Diarrhœa diminished but he had still occasional dizziness.

CASE 7.—A man of 45 complained of dysentery for the previous three months and dermatitis for 20 days with itching of the skin of his hands, feet, and neck. His face was covered with sulphur granules, of which three hundred were counted on an area 1 cm. wide along the free border of one nostril. The sides of his tongue were fissured and the tip red and glazed. The parotid glands were enlarged. There was no free acid and though his appetite was normal he complained that food had no taste. He suffered from bilharzial papillomata and ulcers and had four motions a day. Scrubbing removed the scales on the hands and feet leaving rough skin which reverted to its previous scaly condition in 24 hours. On a full diet for 12 days there was no improvement. Meat and milk were stopped and nicotinamide, 500 mg. by injection, was given. The itching disappeared in 24 hours. In 4 days, on this dosage, peeling had started. By the seventh day the ulcers of the tongue had healed, and the diarrhœa and skin lesions improved, except a line of scales at the margins. He was then given nicotinic acid, 1·0 g. daily by mouth. In three more days the sulphur granules on the previously counted area were 30, and only some thickening of the skin at the lateral side of the foot persisted. This patient after each dose of the drug by mouth had a feeling of warmth, with redness and itching on the face and hands; this lasted for two hours each time.

CASE 8.—A male of 20 years, highly elated, and unable to give any history, was admitted with his tongue glazed and with 2 ulcers on the right side. His lips were fissured and scaly. There was a rash of a chronic type and sulphur granules covering his forehead, nose, cheeks, and chin. He had also bilharzial papillomata and ulcers. His reflexes were brisk and there was bilateral ankle-clonus. He was highly excited and needed sedatives every night. On hospital diet a new ulcer developed on the left side of the tongue surrounded by heaped-up epithelium. By the third day, on nicotinic acid (1·0 g. daily by mouth), the ulcers on the right side had healed, the patient was quiet and needed no more sedatives. Next day the left ulcer had healed, but the skin condition was unaffected. After 5 days' interruption he was given 0·3 g. nicotinamide by injection daily. On the fourth day a new ulcer appeared on the tongue which persisted until the dose was changed to 1·0 g. nicotinic acid by mouth. On the same day healing started and was complete on the seventh day. The drug was then withheld, and 4 days later the skin still showed thickening and pigmentation. He was then given a good scrubbing and normal healthy skin was found beneath. The bilateral ankle-clonus disappeared.

CASE 9.—A man of 25 had complained of diarrhœa for a year and dermatitis for three months. His tongue was glazed, fiery red, shiny, and could not be protruded. His lips were dry, with creases. There was no free acid, but he had occasional postprandial diarrhœa and colic. There was a mild rash on his feet, face, neck, and hands, with ulcers on the latter. After 4 days on hospital diet there was no improvement. On nicotinic acid a burning sensation in his mouth disappeared in 2 days, but after 4 days the appearances of the tongue and mouth were unchanged; the fissures on the hands, however, had healed. In this case each dose of nicotinic acid (1·0 g. daily by mouth) was followed by flushing and a feeling of warmth and itching, and by severe epigastric pain and colic. This happened even when the drug was administered in solution without the patient knowing it.

CASE 10.—A man of 35 had had a seasonal rash for 15 years followed by a continuous dermatitis for the last 4 years. He had an ulcer on the posterior part of the left side of his tongue and complained that his tongue felt like a foreign body in his mouth. There was redness and scaling of the skin of the hands, face, and neck, and there were fissures on the hands. He was treated as an out-patient, with 500 mg. nicotinic acid by mouth daily. On the fourth day his tongue had healed, the abnormal sensation in his tongue had disappeared, and the fissures on his hands had epithelialised. The rash was unaffected but a small scab on his nose, which had been present for 10 years, had disappeared, leaving healthy skin. He was admitted to hospital and given nicotonic acid 1·0 g. by mouth daily for 7 days. The skin lesion cleared up completely.

Seven other cases, treated on the same lines as those described above, gave similar results.

SUMMARY

1. Fifteen patients with pellagra and dermatitis, and two with, presumably, pellagrous stomatitis were treated with nicotinamide.

2. Nine of these were given an ordinary hospital diet, with or without marmite, during a short control period, and there was either no improvement or the condition became aggravated (except in one instance).

3. Nicotinamide effected great improvement in the acute mucous membrane lesions and a slower

improvement in the acute skin conditions. Chronic skin lesions in friction areas and chronic atrophic changes in the tongue were only slightly affected. The appetite, mental condition, and general physical health of all the patients were improved by the treatment.

4. Headache, itching, and warmth of the skin followed treatment in some cases, and one patient had colic after the administration of 1·0 g. of nicotinic acid; but the same dose of nicotinamide led only to transient headache in two patients.

We are indebted to Messrs. E. Merck Darmstadt, for a supply of nicotinamide (in powder and ampoules).

ACUTE GONORRHŒA TREATED WITH M. & B. 693

REPORT ON 100 CASES

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Towards the end of May, 1938, through the courtesy of the manufacturers, Messrs. May and Baker Ltd., of Dagenham, the Glasgow Venereal Diseases clinics were given the opportunity of testing the effect of M. & B. 693 on gonorrhœa. This test has now reached a stage at which the preliminary results may be worth recording. The test was carried out in three different clinics, situated in three widely separate parts of Glasgow and quite independent of each other, a different medical officer being responsible in each. The report from each of them is based on at least 100 cases; so that in all 300 cases have been dealt with.

A notable feature of the reports by the medical officers concerned was the remarkable agreement in the figures quoted. Differences there necessarily were, but they were so trifling as to be negligible. Indeed the figures for one clinic might quite well be substituted for those of either of the other two without vitiating the conclusions.

The following is a report on the test as carried out at Black-street. All cases treated were acute and most of them were early, but fifteen already showed some complication before treatment started. Chronic cases only were excluded from the test.

Experience at Black-street with other types of sulphonamide had already shown that strict daily supervision of all patients taking this type of drug was essential, and that irrigation was a valuable adjunct to the drug—at any rate in out-patients. Patients were therefore instructed to attend daily. At each attendance the following routine was gone through:—

(1) A urethral smear was taken.
(2) The patient was then questioned about toxic effect.
(3) Anterior lavage with a 1 in 10,000 solution of potassium permanganate was given.
(4) A day's supply of 0·5 g. tablets of M. & B. 693, according to the dosage described below, was issued.

The patient was warned against sulphur-containing articles of diet and the taking of salts. He was also warned to spread out his tablets into four doses: 2 tablets after breakfast, 1 after the midday meal, 1 with food in the late afternoon, and 2 after the evening meal. The dosage was maintained at 3 g. daily for the first five days and was then dropped to 2 g. daily for the next two days. The total dosage was therefore 19 g. in seven days. Irrigation was used from the start, being given daily for the first fortnight and on alternate days for the next week. The total duration of treatment was therefore twenty-one days.

SHOULD TREATMENT BE DELAYED?

This routine is the result of experience with sulphanilamide (Streptocide) in early cases at Black-street and is adopted in spite of the findings of others that delay for eight to ten days from the onset of disease before starting sulphanilamide gives better results. Close scrutiny of 100 early cases treated with sulphanilamide at Black-street (McGregor-Robertson 1938) hardly bears out the advantage of delay, since the clinical cures amounted to 75 per cent. and the complication-rate was 8 per cent. These cases were selected as early cases in which the duration of the disease at the date of first attendance at the clinic did not exceed one week, and therefore they may be compared with 76·2 per cent. good results and 11·5 per cent. complications quoted by Cokkinis and McElligott (1938), for example, who advocate delay. Any difference in the figures for these two groups is too small to be significant. Further, at Black-street irrigation was found to reduce failure by 15 per cent.

Therefore, in testing the new drug M. & B. 693 treatment began without any delay and further, irrigation was used from the outset.

The duration of the disease before the start of treatment with M. & B. 693 in the 100 cases now under consideration was as follows:—

	Cases	
Under 24 hours ..	7	
Duration of 1 day ..	28	62 per cent.
" 2 days ..	15	
" 3 " ..	12	
" 4 " ..	7	
" 5 " ..	7	
" 6 " ..	3	
" 7 " ..	6	— 85 per cent.

These cases are not selected, except that chronic cases were excluded from the test.

The results obtained show that, whatever may be the facts as regards sulphonamides generally, at any rate with M. & B. 693 delay in starting treatment is unnecessary. Delay is not only unnecessary, but also from the patient's point of view is objectionable and therefore tends to encourage default, since there are other clinics where delay does not take place. This objection to delay is increased by consideration of the difficulties in estimating permanent cure. The sulphonamides in general act with such speed that special tests of cure, such as the complement-fixation test, cease to have any pretence of reliability. Yet we know from the occurrence of relapses that gonococci are not always wiped out by treatment. Indeed it is reasonable to suppose that in many if not most cases gonococci are present lying within the tissues but devitalised to such an extent that they give no evidence whatever of their presence. That, at any rate, is my view of the state of affairs immediately after treatment with sulphonamides. If this view even approximates to the truth, it is logical to minimise tissue invasion by early administration of M. & B. 693.

This view has also a bearing on the use of provocative methods of test for cure, especially when applied

too early. When these methods produce no response, it does not necessarily follow that the patient is cured: it seems more likely that the provocation has been insufficient. If on the other hand provocation produces relapse, the patient is once more back at the start of his treatment. These considerations suggest that in the estimation of ultimate cure repeated clinical examination and prolonged observation are more useful than special tests.

DAILY URETHRAL SMEARS

With M. & B. 693 the daily smear does not show the peculiar granularity of background and the loss of definition in the cellular elements which are seen with sulphanilamide. Nor is the replacement of gonococci by other organisms so conspicuous—though still not entirely absent. On the other hand, a new feature is apparent. In many cases the gonococci do not persist long enough to be seen in the smears twenty-four hours after treatment starts. When, however, gonococci do persist they tend to be extracellular. These appearances may persist for two or three days. The gonococci may then simply disappear. Not uncommonly this disappearance of gonococci is preceded by an increase in their numbers, and then they may be massed together into large clumps. Persistence of organisms other than gonococci is unusual, though it is seen occasionally. Smears become free from gonococci in 1·8 days on an average. Discharge disappears in 4·5 days on an average. The latter average would be slightly shorter, were it not that in some cases a clear mucoid discharge (or gleet) persists for a few days. This clear mucoid discharge contains epithelium as its only solid constituent—and that in amount insufficient to produce opacity. Subsequent urethroscopic examination has not associated any lesion of the mucosa with the persistence of the mucoid discharge, which is probably due to chemical irritation.

The gonococci disappeared after the following intervals:—

24 hours in	57 cases	4 days in	5 cases
2 days „	18 „	6 „ „	1 case
3 „ „	19 „		

In 4 cases gonococci disappeared only to return in twenty-four hours or so. This was found to be due to irregularity on the part of the patient in taking his tablets. These patients completed their treatment normally and differ in no way from the others. Hence, apparently, slight irregularity in treatment is not likely to lead to failure.

TOXIC EFFECTS

Every toxic effect, however slight, has been noted, and to obtain accuracy patients were closely questioned each day, leading questions being carefully avoided. About 45 per cent. of patients complained of toxic effect. Many showed only one effect, but others showed two or even three effects simultaneously. The corresponding figure for sulphanilamide in a similar series of 100 cases was 60, but this 60 included only those cases in which the toxic effect was severe enough to warrant reconsideration of dosage. The M. & B. 693 dosage was modified in 5 cases only, whereas with sulphanilamide dosage was modified 15 times.

In the 5 cases of modification of M. & B. 693 dosage apparent cure was obtained in spite of modified dosage, whereas with sulphanilamide 4 out of the 15 cases of modified dosage did not respond to the treatment. Broadly viewed, the toxic effects of M. & B. 693 are much less striking than those of sulphanilamide, and numerically they are probably also much less frequent, when one considers the different standards used in assessing their presence. Further, the possibility of serious effects resulting from the use of M. & B. 693 seems to be definitely smaller.

Taking these effects individually:—

Headache seems to be the commonest, but, although often troublesome and even severe at times, it alone has not led to modification of dosage.

Nausea is the next commonest effect and in 5 cases led to vomiting; and yet in only 1 case did this lead to modification of dosage.

Dizziness was next in order of frequency, and this in association with other effects—especially when the patient's employment implied some special risk—led to modification of dosage.

A *rash* was seen on four occasions. In none could exposure to sun be blamed. Two rashes appeared on the eighth day and two on the ninth day after treatment started (one and two days after treatment had stopped), and the rash was much more generalised than that seen with sulphanilamide. It was also more like measles than any previously seen.

Breathlessness was seen once only, and that quite free from any suggestion of cyanosis. Indeed cyanosis has not been noted at all with M. & B. 693; nor has jaundice been seen at Black-street; nor any toxic effect suggestive of a process of red blood-cell destruction. The last statement is supported by the fact that the hæmoglobin estimation taken before starting and immediately after the M. & B. 693 course shows only a slight drop—about 5 per cent. (Sahli scale).

RESULTS

In this group of 100 cases there has not been a single failure. All patients have been free from discharge at the end of the three-week period of irrigation. It is, however, much too soon to come to any conclusion about ultimate cure. It is hoped that most of them will undergo final tests before being dismissed.

The period of observation naturally varies, but in some cases this period is as long as six months, and in many it is over three months. Most patients have had at least one complete clinical examination, and some more than one, without any reappearance of any sign of active disease.

Relapses.—The necessity for caution with regard to early dismissal is emphasised by cases of relapse and by cases of late onset of complication. There have been 4 cases of possible relapse, occurring between the fourth and sixth week after all treatment ceased. Of these, 3 were apparently true relapses, in that close questioning failed to elicit admission of re-exposure, whereas alcoholic excess was admitted. In all these gonococci were present. In the fourth case re-exposure with his wife was admitted. The wife was then (for the first time) examined and found to be infected with gonococci. This case therefore is probably a reinfection rather than a relapse. In 2 other cases of apparent relapse gonococci could not be found in the smear, although other organisms were present in large numbers. These cases were not classed as relapse, and both yielded rapidly to routine irrigation.

Complications.—The only gross complication arising during treatment was one of epididymitis. This complication arose a fortnight after the completion of treatment, and there was no other clinical evidence of infection—nor did any such evidence develop later. The case was, on the patient's first attendance, quite clearly an early acute anterior gonorrhœa

without complication and with a one-day incubation period. The daily smear was free from gonococci in twenty-four hours after treatment started, and the discharge disappeared by the fourth day. One patient developed folliculitis during treatment. This, however, did not slow his response to treatment in any way. He has been under supervision for over three months since completing his treatment and has shown no further signs of infection.

Rheumatism has been seen twice, but in each case re-exposure has preceded the onset, giving rise to an infection by organisms other than gonococci (coliform and diphtheroid). One of these last two, however, requires close review in view of the possibility that it is one of late onset of gonococcal complication. The details are as follows:—

This was an early case of three days' duration of infection before treatment started. The urethral smear was free from gonococci in 48 hours, and the discharge disappeared in five days. The patient had a marital re-exposure a month after the cessation of treatment with M. & B. 693 and developed a slight mucopurulent discharge. The smear contained no gonococci, but it showed many small Gram-negative cocci and diphtheroid organisms. Irrigation caused the disappearance of the discharge in a week. A fortnight after the disappearance of the discharge he complained of rheumatism. At this point he was free from discharge, the urine was clear, prostate and vesicles were normal to the touch, and the prostatic smear was normal. A month later (2½ months after M. & B. 693 treatment ceased) there was fluid in the right knee—no redness or pain, no muscular atrophy, but stiffness and limitation of movement. He was then given M. & B. 693 1·5 g. for six days and during that time the fluid disappeared from the knee. This case is still under observation.

Besides these early cases already dealt with, a smaller number of patients who have not responded to sulphanilamide have been given M. & B. 693. These have also responded to M. & B. 693 rapidly and apparently as fully as the early cases. One case is of particular interest. It was one of a small number which not only did not respond to sulphanilamide but also appeared to be made worse by repeated courses, until it resisted not only sulphanilamide but also all forms of treatment.

This patient was given sulphanilamide early in January and responded but relapsed. A subsequent course with irrigation again gave only temporary benefit. A different preparation of sulphonamide was then tried but failed. By this time the urethral discharge was purulent and profuse and contained extremely numerous gonococci. No form of treatment had the slightest influence over the condition.

RESULTS AT BLACK-STREET (WITH IRRIGATION) AND BROOMIELAW (WITHOUT IRRIGATION)

—	Black-street (with irrigation)	Broomielaw (without irrigation)
Total cases	100	101
Failures	Nil	6
Relapses	3 (all due to alcohol)	4 (1 due to alcohol)
Reinfections ..	1	2
Complications ..	3 (1 epididymitis, 2 rheumatism)	2 (prostatitis)
Disappearance of gonococci	1·8 days	2·4
Disappearance of discharge	4·5 days	3·3

Early in June M. & B. 693 was given and in twenty-four hours the discharge disappeared. Since then he has been seen from time to time and in November is still apparently cured.

Finally, I am indebted to the medical officer in charge of Broomielaw clinic for permission to use his figures. These are given in the accompanying Table, in which the results at the two clinics may be compared. At Broomielaw M. & B. 693 alone was given, without any other form of treatment—i.e., there was no irrigation. The dosage was 2 tablets thrice daily for seven days.

SUMMARY

(1) M. & B. 693 (19 g. in seven days) was used in the treatment of 100 cases of acute gonorrhœa in males seen in an early stage. Lavage of the anterior urethra with potassium permanganate for three weeks was also given. (2) Delay in starting treatment is unnecessary and undesirable. (3) With M. & B. 693 the daily urethral smear did not show the granularity and loss of definition seen with sulphanilamide; but often the gonococci disappeared in twenty-four hours or, if they persisted, were usually extracellular. Urethral discharge disappeared in 4·5 days on an average. (4) About 45 per cent. of patients complained of toxic effects (headache, nausea, dizziness, rash, dyspnœa); but the toxic effects of M. & B. 693 were less than those of sulphanilamide. (5) All patients were cured of urethral discharge in three weeks; but it is too early to say how many were finally cured of the infection. In judging cure, prolonged observation is preferable to provocative tests. There were 4 cases of possible relapse, but 1 of them was probably a reinfection. In 2 cases of apparent relapse gonococci were not found. (6) The only gross complication arising during treatment was epididymitis in one patient. Another patient developed folliculitis. (7) Similar results were obtained with 101 cases at another Glasgow clinic.

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POSSIBLE FALLACIES IN CHEST-LEAD ELECTROCARDIOGRAMS

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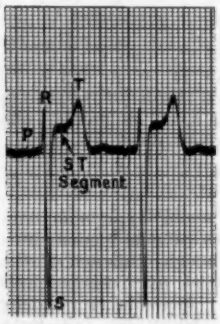
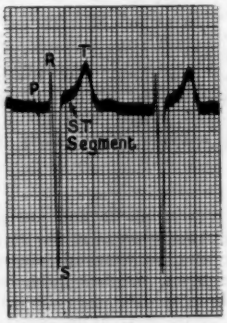
(From the Children's Heart Hospital, West Wickham)

EINTHOVEN'S original conception of the three-lead electrocardiogram (E.C.G.) has remained unchanged for a generation. Almost the entire edifice of clinical electrocardiography has been erected within the framework of the equilateral triangle, surely a unique tribute to his fundamental insight into the principles involved.

The modern electrocardiograph, made to register the three standard leads, has been so greatly perfected that most cardiologists have now come to rely on their tracings without having to inquire too deeply into the electrical workings of the particular machine in use. Chest leads, however, are a comparatively recent innovation (Wolferth and Wood 1932), and the question now arises whether the registration of the new leads may not confront some of the modern instruments with electrical conditions they were not originally designed to meet.



FIGS. 1A



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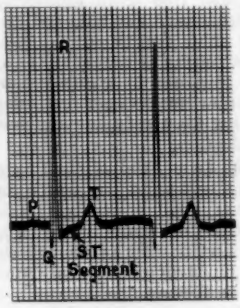

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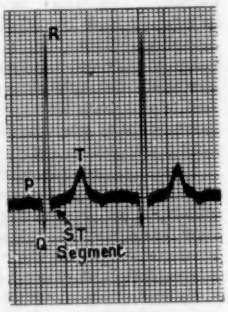

2B

FIG. 1A.—Electrocardiogram taken with condenser instrument and with chest electrode at level of 4th interspace on the left parasternal line, showing elevation of S–T segment 5·5 mm. above zero line (abnormal curve).

FIG. 1B.—E.C.G. taken with compensator instrument and with chest electrode in same position as in Fig 1A, showing elevation of S–T segment 2 mm. above zero line (within normal range).

FIG. 2A.—E.C.G. taken with condenser instrument and with chest electrode on outer border of cardiac impulse (lead IV F), showing depression of S-T segment 3 mm. below zero line (abnormal curve).

FIG. 2B.—E.C.G. taken with compensator instrument and with chest electrode in same position as in Fig. 2A, showing S–T segment in zero line (normal curve). Standard sensitivity of string in all curves.

COMPARISON OF LIMB LEADS AND CHEST LEADS

Limb leads and chest leads both register the electric variations originating in the heart.

With *limb* leads both electrodes are, for electrical purposes, infinitely distant from the heart. Slight alterations in the positions of the electrodes on the limbs have therefore no appreciable influence on the curve. The two electrodes can thus also be counted as equidistant from the two sides of the heart, emitting currents of largely opposite values. In travelling from the heart to each electrode the currents interact and partially neutralise each other, diminishing the voltage of the original current.

With *chest* leads, on the other hand, one electrode is very near the heart; hence every change of its position will alter the shape of the E.C.G. The other electrode is so far away that its exact situation does not matter.

Nevertheless the second electrode has a very slight effect on the tracing. Attempts have therefore been made to eliminate its influence altogether and virtually to create a "unipolar" E.C.G. (Wilson et al. 1934, Eckey and Froehlich 1938). The method devised by the latter authors, though perfect in theory, is not practicable for routine use; yet it has shown that the disturbances created by the potentials at the site of the indifferent electrode are almost negligible.

The chest electrode is particularly near one side of the heart, according to the site chosen.

In travelling the small distance from the heart to the chest electrode there is not the same opportunity for the currents to neutralise each other; they are almost tapped at source, and hardly any neutralisation takes place. Thus the electric variations of one point of the heart are recorded almost intact. The absence of neutralisation results in higher voltage (Groedel 1934).

The composition of the chest-lead electrocardiograms is thus mainly determined by the site chosen for the exploring electrode. Generally the negative deflection of the ventricular complex prevails over the sternum, and the positive deflection becomes larger as the apex is approached (Master et al. 1937; own observations). The voltage of chest leads depends on the thickness of the chest wall and will be greater when the tissues which separate the electrode from the heart are thin. Thus the higher-voltage records generally encountered in chest leads, as compared with the standard leads, are even further exaggerated in children. This is particularly the case when the chest electrode is just to the left of the sternum at the level of the fourth rib, for in this position the electrode mainly taps the right ventricle and is relatively far from the antagonising influence of the left ventricle. With the electrode at this point, and sometimes at the cardiac impulse (lead IV F), deflections often exceed 40 mm., particularly in children, with standard sensitivity of the string. Excursions of this size are practically non-existent in leads I, II, and III, and the purpose of this communication is to point out the serious errors which may arise when chest leads are taken with instruments incorporating a condenser.

ELIMINATION OF SKIN CURRENTS

Since the beginning of electrocardiography one of the difficulties has been the presence of skin currents which superimpose themselves on the heart current. If these are not eliminated, they cause an unprotected string to wander constantly out of the centre of the magnetic field and so produce a very erratic curve. Advantage being taken of the fact that skin currents are of low voltage and of constant direction, two methods have been evolved for their elimination. The one consists in sending a current of equal magnitude but opposite direction through the fibre, thus neutralising the skin current. This involves the use of a rheostat, with which the exact flow of compensating current can be constantly adjusted. The second method consists in trapping the skin currents automatically in a condenser which can be bridged only by the high-frequency currents of the heart. This method, first advocated by Cremer (1906) and later by Zwicke (1912), has the advantage of economy in manufacture and of simplicity and speed in the taking of records, but it has never recommended itself as entirely satisfactory to those carrying out electrocardiographic research (Kraus and Nicolai 1910).

The few warnings given of the possible fallacies entailed in the condenser principle (Schellong 1926, Schwarzschild and Kissin 1934) have not been sufficiently appreciated, and so long as the classical leads alone were used, instruments built on this system produced curves sufficiently free from distortion to be reliable for general clinical interpretation.

Further consideration will soon show how, with the advent of chest leads, this no longer holds good, and why latent electrical sources of error are liable to appear under certain conditions.

SOURCES OF ERROR

Distortions will occur whenever a condenser is allowed to acquire a charge big enough to influence the excursions of the string, a possibility governed by the following factors: (1) the resistance of the galvanometer circuit, (2) the capacity of the condenser, (3) the speed of the deflections, and (4) their voltage. The degree of distortion is inversely proportional to the first three factors and directly proportional to the fourth. The first two factors are constants in any given set, provided that the condenser does not lose capacity through deterioration. The speed and voltage of the deflections alter from case to case, and the voltage is chiefly increased in chest leads.

The distortion is brought about in the following way. A current of high voltage will charge the condenser as it passes through it. Later, when the condenser becomes discharged, the galvanometer string will tend to be deflected in a direction opposite to the initial deflection. If, however, the initial big deflection is closely followed by a second deflection in the opposite direction, the condenser will now receive an opposite charge, which will more or less completely neutralise the first one. In other words a condenser charge derived from a big R wave would be partly neutralised by the opposite charge derived from a moderately sized S wave. When, however, a big R wave is not followed by an S wave, or R is absent or small and S predominates, no neutralisation of the condenser charge occurs, and it is left to exert its influence on the S–T segment of the electrocardiogram. The S–T segment will thus show a deviation from the zero line—elevation or depression—in the direction opposite to the preceding big deflection.

The same type of distortion will be produced with a wave of moderate voltage but slow speed, such as is found in intraventricular conduction disturbances; for, though the electrical force charging the condenser be smaller, there is more time for the charge to take place. In this instance the error is not of great importance, for in any case we are dealing with a pathological curve. When, however, the deviation of the S–T segment is merely caused by the voltage of the preceding deflection, distortions of an otherwise perfectly normal curve may be taken wrongly as evidence of serious myocardial impairment.

Changes of this kind in the chest leads closely simulate, for instance, those we are familiar with in coronary disease. Errors in diagnosis are therefore liable to be made in doubtful cases, since a good deal of importance is attached to these characteristic electrocardiographic disturbances. Mistakes may well occur when tracings taken on a compensator model are later compared with those taken on a condenser instrument.

Something of this nature happened during an investigation on rheumatic carditis carried out at the Children's Heart Hospital, West Wickham. A serious error was narrowly avoided when a large series of cardiac cases was examined with a condenser instrument, while control cases were examined in a different locality with a compensator set free from distortions. During this work it was found that in slightly more than half the children investigated the curves showed abnormally elevated S–T segments when the electrode was placed over the left parasternal line at the level of the fourth interspace (Fig. 1A). In about a fifth of the cases abnormal curves with a depression of S–T were produced with the electrode at the cardiac impulse (lead IV F) (Fig. 2A). Eventually a fallacy was suspected, and this was proved in the following way. A fresh series of electrocardiograms was taken on the condenser model, and, with the electrodes left in position, each patient was immediately connected with another instrument, in which the skin current was eliminated by the compensation method. Further tracings were then taken (Figs. 1B and 2B), in which abnormalities of the S–T segment were no longer apparent. The resistance of the patients was in the neighbourhood of 2000 ohms and remained so throughout the experiment.

Condensers in electrocardiographs are widely used with the amplifier type of instrument as well as with string galvanometers. Modifications will be necessary to enable these instruments to deal with the large deflections sometimes encountered in chest leads. Since the resistance of the galvanometer circuit cannot be much increased without incorporating an inconveniently thin fibre, the only measure would be to increase the capacity of the condenser. The liability of condensers to deteriorate, with consequent loss of capacity, is a further consideration, and some means of checking this should also be provided.

Experiments with condensers of different capacities are being undertaken at present by one big firm of electrical instrument makers as the result of this investigation. It is found that a condenser of 500 microfarad capacity—approximately five times the capacity previously used—can deal with deflections up to 60 mm. without appreciable distortion.

SUMMARY

(1) In chest leads, every change in position of the electrode near the heart will alter the shape of the E.C.G. (2) Generally the negative deflection of the ventricular complex prevails over the sternum, and the positive deflection increases as the apex is approached. (3) The proximity of the chest electrode to the heart prevents neutralisation; thus the voltage is higher. (4) The higher voltage is exaggerated in children. (5) Serious error may arise when chest leads are taken with instruments incorporating a condenser. (6) To prevent such errors a condenser with a much larger capacity than usual should be used.

My sincere thanks are due to Dr. Bernard Schlesinger for help and advice throughout this investigation, and to the matron and nursing staff at the Children's Heart Hospital.

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EXTRAPLEURAL PNEUMOTHORAX

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THE treatment of pulmonary tuberculosis by extrapleural pneumothorax is by no means new. The procedure which may be justly considered its predecessor was initiated as early as 1891 by Tuffier, who carried out extrapleural pneumolysis, filling the space with neutral fat (Tuffier 1926, Alexander 1937). Tuffier (1913) was also the first to attempt to maintain the space by the introduction of air.

Sarfert (1901) performed an extrapleural pneumolysis with a gauze filling as a preliminary to cavity drainage, and Schlange (1907) used the same operation to compress a tuberculous lung. Archibald (1920), Sebrechts (1929), and Morriston Davies (1930) used similar procedures, utilising a living pedicle graft of the pectoralis major muscle. Mayer (1913) suggested that compression should be maintained with an inflatable rubber balloon.

Extrapleural pneumothorax was popularised again by Nissen, who in 1933 repeated successfully Tuffier's original attempts, using air to maintain the collapse (Nissen 1937). In spite of his interesting reports and those of Graf (1936) and Schmidt (1936), this operation, which originated in France, elicited but little enthusiasm from French thoracic surgeons, and it was only last year that one of us (A. M.) with his associates attempted to give it a fair trial (Maurer et al. 1937). The conservative attitude shown has no small justification, for although extrapleural pneumothorax undoubtedly has certain advantages it is of all partial operations probably the most disadvantageous. Schmidt in a recent article (1936) and in reports to the French Tuberculosis Society has given his personal experience with 200 cases. At the end of one year 63 per cent. of his patients had to be given oil, air being unsatisfactory to maintain the collapse.

So far at Laennec Hospital and the allied institutions 78 operations have been performed, and this number is perhaps large enough to allow us to draw tentative conclusions of our own.

INDICATIONS

In considering the indications for extrapleural pneumothorax it should be kept in mind that intrapleural pneumothorax and thoracoplasty are the procedures of choice whenever possible. It is well to emphasise that extrapleural pneumothorax can in no way be considered safe or beneficial when the lesion is of a type that cannot properly be treated by intrapleural pneumothorax. Extrapleural pneumothorax should be reserved for cases in which (1) intrapleural pneumothorax is impossible because of pleural adhesions and (2) the patient's general condition does not allow thoracoplasty.

Schmidt (1936), outlining the scope of extrapleural pneumothorax, has stated that in fairly "young" stabilised lesions at the apex, with slight involvement of the contralateral side, the indications for this operation may be considered absolute. When similar lesions are of some duration and progressing, with the general physical condition of the patient unsatisfactory, the indications are "relative." We assume a somewhat more conservative attitude, feeling that every patient should try a sanatorium cure before undergoing this operation. If the general physical condition of the patient improves rapidly, he may become fit for thoracoplasty; if, on the other hand, no progress is noted, and if the lesion is not too large and not lower than the fifth rib, extrapleural pneumothorax may be applicable. It is doubtful if extrapleural pneumothorax can benefit lesions that are very active or simulate broncho-pneumonia.

Extrapleural pneumothorax may be considered also where doubt is entertained about the lesion of the contralateral side and when it is feared that thoracoplasty (seldom a single-stage operation) will not be well tolerated.

We are particularly impressed with the potentialities of this operation in children. Thoracoplasty, however carefully carried out, causes profound change in growing skeletons, whereas the effects of extrapleural pneumothorax are fairly limited. In pregnant women, too, extrapleural pneumothorax is frequently the operation of choice. Rapid collapse of developing lesions without great trauma often achieves satisfactory clinical results without interrupting pregnancy.

Our experience with 78 cases does not permit us yet to consider this operation in any other light than experimental, but we are inclined to believe that it is useful in a limited number of cases.

TECHNIQUE

The operation may be carried out entirely under local or regional anæsthesia. In selecting the place for the incision either the posterior or anterior approach may be used. The posterior approach is in many ways preferable; not only does it give better clinical results but it also avoids the deforming scar which is particularly embarrassing to women. In front we always remove 6–7 cm. of the second rib with its cartilage, whereas posteriorly 10 cm. of the third, fourth, and fifth ribs is removed close to the transverse processes. Care must be taken to do the resection subperiosteally, leaving the periosteum as far as possible intact. After removal of the rib the remaining periosteum is incised in the central portion, thus bringing into view the endothoracic fascia. This is the plane of cleavage, and the surgeon can proceed carefully and slowly with the separation of tissue. Usually that presents but very few difficulties; the endothoracic fascia is loose and yields readily to a blunt instrument or to the carefully directed finger.

As soon as an area no longer in the direct rays of the theatre light is reached, a small electric lamp must be used. At Laennec Hospital a blunt spatula with an electric bulb attached was especially devised for this purpose. The separation of tissues is somewhat difficult in the area directly adjoining the cavities, owing to peripleuritis. The endothoracic fascia is considerably thickened and fibrosed. Carelessness may produce a fistula. The separation is carried out both posteriorly and anteriorly. It is particularly important to separate the entire apex and to go as far as possible toward the mediastinal surface. This operation is seldom carried beyond the seventh rib. It is not unusual to find on the day following the operation a complete separation reaching the diaphragm.

After the tissues have been separated, the field has to be inspected on all sides for signs of bleeding. Hæmorrhage remains one of the most distressing and serious complications; it occurs mostly when separation of the tissues near the root of the lung has been carried too far. Bleeding is controlled by a gauze pack saturated in hot saline solution. The wound is closed in layers without any drainage. Very careful closure of the wound is most important; any leak may cause subcutaneous emphysema or a fistula.

The patient is fluoroscoped on the day following the operation. In a vast majority of the cases there is an accumulation of fluid. This is aspirated, and then air is introduced at atmospheric pressure. This is repeated daily for four days. After the fourth day air is introduced at a positive pressure not exceeding 10 mm. Hg. After the introduction of air at positive pressure it is no longer necessary to fluoroscope the patient daily; twice a week suffices. After about a fortnight the fluid usually no longer forms, and the interval between the introductions of additional air may be increased. The patient suffers but little inconvenience. The wound undergoes an uneventful healing, and the outside silk sutures are removed on the eighth day.

Unfortunately this operation is not devoid of complications. The first is post-operative hæmorrhage. In spite of all precautions hæmorrhage takes place in about 20 per cent. of the cases. If the patient presents symptoms of shock, a transfusion must be given immediately; it usually not only brings back the blood pressure to normal but also arrests the hæmorrhage. The second complication, subcutaneous and mediastinal emphysema, may be avoided, first, by careful closure of the wound and, secondly, by giving enough sedative to control the cough. Perforations are the most dangerous and annoying complications. There are three types: one is the result of the awkwardness of the operator; the second is due to interference with the blood-supply of the lesion too close to the surface, which causes a necrosis of the wall with subsequent perforations; the third is similar to that seen in intrapleural pneumothorax when the lesion becomes exteriorised. Whatever the mechanism, the effects are nothing short of disastrous. The subsequent infection not infrequently terminates fatally.

Secondary infection of the extrapleural pneumothorax may be due either to the tubercle bacillus or to some external factor. The tubercle bacillus was present in all our cases in which the fluid was examined. Its presence does not necessarily imply suppuration. On the other hand, other organisms almost always cause pus. Fortunately it is not very alarming; a simple puncture repeated several times and associated with lavage of mildly antiseptic fluid clears the condition in two to four weeks. The spread of tuberculosis in extrapleural pneumothorax, though less common than in thoracoplasty, still remains a serious complication.

Occasionally a surgeon is prevented from carrying out extrapleural pneumothorax by extensive peripleuritis with considerable thickening of the tissues and obliteration of endothoracic fascia. In such cases the procedure has to be abandoned altogether or thoracoplasty may be substituted.

When an extrapleural pneumothorax seems to decrease in size in spite of the introduction of air, it is well to introduce oil, which is kept until the end of the treatment. Recently we successfully used extrapleural pneumothorax as an adjunct to an incomplete intrapleural pneumothorax in a case in which the lung could not be collapsed at the apex because of pleural adhesions. After separation of the parietal pleuræ from the dome of the chest we successfully joined both cavities, thus allowing a complete collapse of the lung.

RESULTS

So far 78 cases are available for statistical study, six to eighteen months having elapsed since the initiation of the procedure. In 6 of these the operation was attempted but had to be abandoned because of very severe peripleuritis. In another case thoracoplasty followed the extrapleural pneumothorax, and in yet another extrapleural pneumothorax successfully supplemented intrapleural pneumothorax. This leaves 70 cases.

We adopted the following classification:—

A = Collapse perfect; no tubercle bacillus in sputum on several successive examinations; no complications; good physical condition.

B = Good collapse; presence of tubercle bacillus; transient complications.

C = Unsatisfactory collapse and aggravation of symptoms.

D = Death.

Out of the 70 cases 47 fulfilled the ideal indication—namely, that thoracoplasty was impossible or very undesirable, and that the lesions were fairly "young." The results were as follows:—

A,	20 cases	(42 per cent.)
B,	13 cases	(28 ,,)
C,	7 cases	(15 ,,)
D,	7 cases	(15 ,,)

In short, we succeeded in obtaining good results in about two-thirds of our cases.

In the remaining 23 cases thoracoplasty was possible, though not altogether desirable. The general condition of the patient made us feel that it was better to limit ourselves to a more conservative operation. The results were as follows:—

A,	9 cases	(39 per cent.)
B,	7 cases	(30 ,,)
C,	2 cases	(10 ,,)
D,	5 cases	(21 ,,)

In short, we again succeeded in benefiting about two-thirds of our cases.

In drawing conclusions from these two series of cases we may be misled if we are not cautious in our analysis. In the first group the results are most gratifying, since the operation of thoracoplasty was impossible in any event. On the other hand, in the group in which thoracoplasty was possible the results achieved by extrapleural pneumothorax were in no way superior to the average expectation of thoracoplasty, which has a distinct advantage over extrapleural pneumothorax in that the results achieved are usually final.

SUMMARY

(1) The history, indications, and technique of extrapleural pneumothorax are given. (2) Of 78 cases in which extrapleural pneumothorax was attempted, 6 proved inoperable, 1 also underwent thoracoplasty, and 1 also had an intrapleural pneumothorax. Of the remaining 70, thoracoplasty was considered impossible in 47 but possible in 23. In both of these groups the results of extrapleural pneumothorax were good in about two-thirds of the cases.

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MEDICAL SOCIETIES

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

AT a meeting of this society held in Liverpool on Nov. 11th Mr. PERCY MALPAS described

A Modification of the Anterior Colporrhaphy Technique

The speaker first discussed one of the general rules of plastic surgery, that when tissues are repaired the parts should be sewn together while they lie in the position which they are meant to occupy. In repairing the vagina and the uterine supports, observance of this rule is hampered by the difficulties of access, and in most techniques the rule is circumvented by various devices such as leaving sutures untied until the end of the operation, insisting upon suture of the higher end of the incision first, or adopting various modifications of the normal anatomy of the parts, for instance forward displacement of the bladder and the peritoneum of the uterovesical pouch. These methods are usually satisfactory and perhaps the only cases in which they prove disappointing are those of high cystocele associated with retroversion. On the other hand, it seems desirable to adhere to the principle of suture in situ as far as possible. In the case of the anterior colporrhaphy operation this entails an intravaginal technique.

In the procedure used by Mr. Malpas the uterus and bladder are held in their final positions almost from the start to the finish of the operation. This is not completely possible when the sutures reattaching the vaginal mucosa to the cervix are being inserted, and at this step the cervix must be pulled down while they are passed, although it may be pushed up again before they are tied. The cervix is grasped and drawn down in the usual way and the extent of the prolapse and the size of the cystocele are determined, and an estimate is made of the amount of redundancy of the vaginal walls. In order to judge how much vaginal wall should be removed, the vaginal incisions should be made while the cervix is pushed upwards and backwards. If the cervix is to be removed as well, the customary incision encircling the cervix is then made. The cervix is removed and the sutures refashioning the external os are inserted and tied with the cervix held high up in the vagina. The next step is the most important. As soon as the external os is refashioned the anterior suture on the cervix is cut short and the ends of the suture grasped with forceps. By pushing these forceps upwards and backwards the assistant elevates the uterus until the vagina is the right length and the uterus is in a normal position. He must maintain the backward displacement of the cervix throughout the subsequent steps. A retracting stitch placed on the vaginal walls enables the flaps to be held aside. The upward displacement of the cervix into its desired and final position puts the pubocervical fascia on the stretch. A stitch is inserted drawing the fascia together in two places, the first just in front of the cervix, the second at its lower end. If these sutures are cut short and the short ends held with forceps, the assistant can thus put a longitudinal strain on the fascia. The intermediate sutures in the pubocervical fascia are then inserted.

The final stage of the operation consists in the approximation of the vaginal flaps. The cervix is grasped again, and interrupted stitches are inserted intravaginally from above downwards while the cervix is still held upwards and backwards. As in the usual technique these stitches pick up the submucous fibrous tissue as well as the vaginal skin. All the stitches except those refashioning the external os are inserted while the uterus is held in its final position. At the end of the operation the uterus will be found anteverted and the vagina long. The main difficulty in the operation is the insertion of the sutures, and Mr. Malpas has found it best to insert them with a small fully curved needle held on a light pattern needle holder.

Prof. DANIEL DOUGAL (Manchester) described cases of non-specific ulceration of the vulva, and Dr. A. A. GEMMELL (Liverpool) and Mr. N. L. EDWARDS (Derby) described some similar cases. Mr. C. M. MARSHALL (Liverpool) reported a case of renal decapsulation, and Dr. GEMMELL described a case of an ovarian tumour complicating a carcinoma of the cervix.

LIVERPOOL MEDICAL INSTITUTION

AT a pathological meeting of this institution, held on Dec. 1st, with Dr. E. GILBERT BARK, the president, in the chair, a paper on the pathology of

Chronic Aortic Valvular Disease

was read by Dr. R. Y. DAWBARN. There are, he said, three common chronic diseases of the aortic valve—syphilis, rheumatism, and Mönckeberg's calcific degeneration. Although the macroscopical features often suffice to distinguish these conditions, there is likely to be difficulty where much calcification has followed on an old rheumatic process, and where the calcific degeneration of Mönckeberg is accompanied by much fibrosis. In such cases microscopical examination may be helpful, and it is advisable to stain the sections by some method which shows the elastic fibres. In cases of old rheumatic disease the cusps are opaque and thick, especially along the free border, and some or all of the following microscopical changes can usually be found: (1) thickening of the ventricular layer of the cusp with reduplication of the elastic lamina, especially in the subaortic angle; (2) vascularisation of the cusps and ring with capillaries and muscular arterioles; (3) scarring of the ring with increase of elastic fibres; (4) calcification either in the ventricular layer or aortic layer; or (5) thickening of the subendothelial tissue in the pocket. Rheumatism in early life may lead to a biscuspid deformity of the aortic valve, and Louis Gross considered that most cases of this condition, discovered in adults, have a rheumatic basis. Mönckeberg's calcific degeneration is a disease mainly of the fibrous aortic layer of the cusp, which is characterised first by the deposit of lipoids, and then by calcification. Large calcified craggy masses may be formed in the cusps which project mainly into the sinuses of Valsalva. The ventricular layer of the cusp is not thickened as in rheumatism, but is usually normal, or else thinned out by reason of the stretching and distortion caused by the calcareous masses.

Dr. W. S. SUTTON thought that in view of the work of Gross and others on the vascularity of the heart valves, especially in relationship to the age-incidence of rheumatic endocarditis, Dr. Dawbarn's opinion that there are no blood-vessels in the aortic

(*Continued at foot of opposite page*)

REVIEWS AND NOTICES OF BOOKS

The Extra Pharmacopœia (Martindale)

Vol. II. 21st edition. London: The Pharmaceutical Press. 1938. 22*s.* 6*d.*

THE shade of W. H. Martindale should be content at the form taken by the Extra Pharmacopœia under the direction of the Pharmaceutical Society of Great Britain. The personal touch has gone—that was inevitable; but this volume is reminiscent throughout of what the second part of the chemist's bible was becoming in its originator's hands. It contained the spill-over of the more orderly subject matter of the first part—all the pleasant by-ways of the meeting-ground of medicine and pharmacy. In format the book is vastly improved. It now contains 1148 pages which have been reset in type that scarcely taxes the presbyope. As before, the largest component is the section of analytical addenda to the chemicals and materia medica of Vol. I. A glance at this section shows how widely the compiler has looked round for his references, national and international, and how much new matter has been incorporated. Perhaps the only entirely new section is the one on nomenclature of organic compounds, which is easy to read and assimilate, partly because of a lavish rendering of the benzene ring, hardly consistent with the rigid economy of space evident elsewhere. Welcome too is the inclusion of ethical proprietaries which have been placed on the market since the first part went to press. If this is not sufficient to induce the practitioner to put the volume on his desk, let us add at random a few of the headings from the table of contents, e.g., indicators, tests for urine, blood, &c., vitamins, milk and milk products, food preservatives, mineral waters, British spas, gas poisoning, diathermy, glossaries—in each of which something good and substantial is to be found. At the end of the preface is a list of those who have collaborated in preparing the volume, of which the general editor is Mr. C. E. Corfield.

British Encyclopædia of Medical Practice

Vol. IX. By Various Authors. Under the general editorship of Sir HUMPHRY ROLLESTON. London: Butterworth and Co. 1938. Pp. 805. 35*s.*

THIS volume contains 66 articles on subjects ranging from mumps to spontaneous pneumothorax. Among the most generally useful is Thomas Hunt's lucid and exhaustive survey of peptic ulcer, a disease all too common among doctors. It may be a source of comfort to our weaker brethren to learn that, in the modern view, tobacco and alcohol are, at most, merely subsidiary or associated factors in the ætiology of peptic ulcer; a third of Hunt's patients had never smoked. This author is optimistic about the results of medical treatment, if carried out thoroughly. In most cases this requires hospitalisation, for its strict and not inexpensive dietetic régime is certainly impracticable in the homes of the poor. According to Hunt most ulcers can be healed by rest and dietetics alone, and it is significant that he allots but a small place in treatment to alkaline powders, and considers massive dosage with alkalis not only unnecessary but dangerous. Izod Bennett does much to unravel the tangled skein of nephritis and nephrosis. On the vexed question of "malignant hypertension" he wisely reserves judgment, being content merely to outline the clinical picture and to indicate the probable manner of death. Donald Hunter attacks the subject of parathyroid disease with characteristic zest and vision. His description of the dramatic improvement which may follow the surgical removal of small parathyroid tumours in certain cases of hyperparathyroidism is both striking and encouraging. Hardly less so is F. J. Nattrass's account of the marked, if temporary, remissions in myasthenia gravis treated with ephedrine, eserine, and Prostigmin.

There is more medicine than surgery in this volume, but the extensive field of œsophageal disease is thoroughly covered by Grey Turner, the constantly recurring diagnostic problem of swellings in the neck by C. F. W. Illingworth, the surgical diseases of the pancreas by Cecil Wakeley, and those of the penis and scrotum by Girling Ball and W. E. Underwood. Ozæna, less conspicuously advertised than its fellows halitosis and body-odour but possibly more trying than either to its victim, is the subject of an article by Lionel Colledge. In the sphere of pædiatrics, R. W. B. Ellis doubts the value of drugs or the operative correction of physical abnormalities in the treatment of night-terrors; epilepsy excluded, readjustment of diet and environment offer, he thinks, the best hope of cure.

Two articles on forensic medicine deserve mention: the first, by Roche Lynch and David Harley, describes the AB and MN systems used in cases of disputed paternity; the second, by Oswald Hempson and Henry Robinson on professional negligence, should be read by all doctors in private practice. Among a number of articles on skin diseases, many of them rare, Cranston Low's should be of help to the general practitioner who is often confronted with, and sometimes confounded by, abnormalities of the finger-nails.

(*Continued from previous page*)

valves was a debatable one. Had he any explanation why the deformed valve of Mönckeberg sclerosis was not more frequently the site of an infective vegetation?

Dr. A. M. ABRAHAMS referred to Dr. Dawbarn's statement that there are normally no blood-vessels in the aortic valves but in rheumatic disease of these valves capillaries appear. Did Dr. Dawbarn imply that these vessels arose de novo? The work of Gross showed capillaries to be present in the valves, which would make the findings in rheumatic valves quite reasonable.

Midwifery

Sixth edition. By Ten Teachers under the direction of CLIFFORD WHITE, M.D. Lond., F.R.C.P., F.R.C.S., F.C.O.G., Obstetric Surgeon to University College Hospital. London: Edward Arnold and Co. 1938. Pp. 676. 18*s.*

SINCE 1917 this remarkable book has gone through six editions and five reprints. In its time it has not escaped the criticisms which books of multiple authorship usually deserve on their first appearance and have to live down. The drawbacks of this system have long been outweighed by the care with which the book has been edited and a determination on the part of the contributors to suppress any theory or proposition which is not favoured by a majority of them. We have been unable to discover any contradictory statement; this may be due to the admirable

plan on which the book has been revised. General discussions are held at a series of meetings, the task of interpreting the consensus of opinion on each aspect of the subject being delegated to one teacher. On this occasion a new safeguard has been introduced; the part originally drafted by one of the present teachers has been reviewed by another member of the team.

In its general arrangement the book remains unaltered. Efforts have been made wherever possible to delete any theoretical considerations which might produce confusion in practice. The reader soon discovers that so-called advances receive no mention unless their value has been proven. Such a course is a refreshing contrast to the current fashion of providing unwieldy bibliographies in students' textbooks. The ten teachers have gone further and reduced to a minimum even references to the names of authorities. This policy has certainly produced a book easy to read and digest, though it means that the student may find it more difficult to follow up any work or ideas that interest him.

The subject-matter is eminently sound and essentially conservative. The sections on antenatal care, the toxæmias of pregnancy, and puerperal sepsis have been rewritten. If recent work abroad is duly confirmed the descriptions of various forms of contraction of the pelvis may require drastic alterations in future editions. There are many new illustrations, including more radiograms. Metric measures have been inserted after the English throughout the book. In fact this volume is even better than its predecessors—almost the ideal book for the student, being practical and not too long. It is generally believed that the doctor whose knowledge conforms to the best orthodox opinion is of most value to the community. Despite its multiple authorship this book as a whole will teach the student the greatest common measure of orthodox opinion; later on his judgment will not be blurred by the recollection of conflicting theories and practice.

Anus: Rectum: Sigmoid Colon

Diagnosis and Treatment. By HARRY ELLICOTT BACON, B.S., M.D., F.A.C.S., F.A.P.S., Assistant Professor of Proctology at Temple University School of Medicine and at Graduate School of Medicine, University of Pennsylvania. London: J. B. Lippincott Co. 1938. Pp. 855. 38*s*.

THIS new work indicates the increasing importance of proctology as a specialty. No reader can fail to be impressed by the immense amount of productive work done in recent years on the rectum and colon, or by the energy and thoroughness with which the essential advances have been here collected and marshalled. The imposing list of references at the end of each chapter is a testimony to Dr. Bacon's industry; the list of 341 references which enriches the chapter on the treatment of malignant tumours must surely constitute another trans-Atlantic record.

The range of diseases of the rectum and colon is fully covered. The opening chapters on anatomy, examination, and anæsthesia are excellent; all modern methods of diagnosis are described and illustrated and the technique of local anæsthesia receives special emphasis. The chapters on venereal diseases of the rectum and anus, lymphopathia venereum, and stricture are among the best in the book and bear witness to the author's wide experience of these conditions. The chapter on proctitis is helpful, due attention being paid to radiation proctitis. After listing some 15 solutions for the injection treatment of hæmorrhoids, the author gives his vote to 5 per cent. quinine and urea hydrochloride. Of the various operative procedures described (Whitehead's operation is not one of them) Dr. Bacon himself uses a clamp and cautery method; he reports good results from the injection of 5 c.cm. of 1 per cent. diothane into the external sphincter at the conclusion of the operation; this is said to give relief from pain for anything from 1 to 7 days after operation.

The foreword by Mr. Lockhart-Mummery refers to the encyclopædic character of this book and this will be deemed a defect by a good many readers. Few will want to read details or study illustrations of 17 operations for prolapse of the rectum for example, or of 15 radical and conservative operations for cancer of the rectum. The expert may be interested to recall the changes of fashion through the years, but the student or practitioner in search of up-to-date teaching on rectal technique is likely to be confused by such a multiplicity of methods, and those of only historical interest need not have been detailed even if they were mentioned. The description of amputation of a prolapse by Mikulicz's method is inadequate, and no credit is given to Ernest Miles for reviving this operation. Fig. 240, showing the suture line between the pelvic colon and rectum several inches above the peritoneal cul de sac, is misleading; it is usually much lower down, slightly below the resutured pelvic floor and about 1½ in. above the anal margin. Judging from the preceding three diagrams the author would appear to be recommending Mikulicz's operation for the treatment of a pelvic procidentia or sigmoido-rectal intussusception; this is contrary to the usual practice and a Moschowitz operation is more likely to effect a cure in this type of case. There is a slip in the legend to Fig. 123 which actually depicts the intrarectal drainage of a submucous and not a retrorectal abscess. These are unimportant issues which hardly mar a complete, informative, and beautifully illustrated book.

Human Powers and Their Relations

By K. W. MONSARRAT. Liverpool University Press; London: Hodder and Stoughton. 1938. Pp. 289. 10*s*. 6*d*.

Mr. Monsarrat's thesis is so comprehensive that the human aspects of the book are but part perspectives of a theme universal in its scope. To preface a book with a discussion of Newtonian concepts, and to end it with the dynamics of the British Empire, is no mean feat of the analytic and speculative faculties. To read, let alone to digest, this volume entails the patient acquisition of a specialised vocabulary and mastery of a logical analysis of unfamiliar concepts. The work however is singularly conscientious, for no word is passed over without careful definition, and despite the logical matrix in which it is set the author can rightly term his method as bio-logical in the strict sense of that hyphenation. His concept of dynamic relation as power-contributing is a pregnant one, and when it is once grasped the difficult theses which follow can be assimilated by a careful reader.

The main principle running through the volume is that of dynamic assemblies, or congregations of increasing complexity from the inorganic to the social. On this flying arc of logic the British Empire hangs perilously poised.

THE LANCET

LONDON: SATURDAY, DECEMBER 24, 1938

R.C.O.G.

H.M. the King has been graciously pleased to command that the British College of Obstetricians and Gynæcologists shall be known as the *Royal* College of Obstetricians and Gynæcologists (19.xii.38).

WHY obstetrics and gynæcology, the third leg of the medical tripod, should have delayed so long in obtaining a college is difficult to say. Probably it was because at the Renaissance and for long afterwards—during the time when medicine and surgery were developing—obstetrics was in the hands of midwives and handy-women and so failed to take a part in the revival. Whatever the cause the fact remains that physicians and surgeons banded themselves together and formed a Royal college in each of the capital cities—London, Edinburgh, and Dublin; while the obstetricians remained ununited—sometimes drawn to the physicians, sometimes to the surgeons, but always without a central body to speak with authority, to guide admissions to the faculty, and to encourage research. That such a want existed was known to every practising obstetrician and gynæcologist. Local societies to a certain extent provided a meeting ground and some stimulus to research, but there was no organisation to speak for all the recognised practitioners in this branch on subjects upon which they alone were qualified to comment. If advice was wanted by the Government or some other body, individuals were consulted for an opinion which might or might not be acceptable to the general body. The chief want, however, was a recognised portal of entry. Some reached it after years of resident clinical work; some by obtaining the M.R.C.P. or, more recently, the F.R.C.S. There was no qualification whose requirements and examinations formed a direct training for this branch of medicine and many drifted into it because there was no room in the section for which they were trained. To recognise this want was simple; but to found a new college to unify practitioners all over the British Empire was far from simple.

The crucial step was taken in October, 1925, when two men (who became first president and first hon. secretary) discussed the scope of such a college and drafted plans for its formation. These were unfolded to a gradually increasing body, until it was found that the movement had the almost unanimous support of teachers and leading obstetricians in the Dominions as well as in this country. Opposition was inevitable and in the first instance the new college had to be content with registration under the Companies Act by the Board of Trade. This was obtained on Sept. 13th, 1929. In the nine years that have passed, the growth of the college in personnel, material, and influence has demonstrated that the public as well as the medical profession has become aware of the importance of obstetrics. Founded to a large extent upon the same lines as the older colleges, the college is governed by a council, of which two-thirds are elected from the fellows and one-third from the members, seats being allotted in definite number to London, the rest of England and Wales, Scotland, and Ireland. Thus any question discussed in the council calls forth the opinion of seniors and juniors from each area. From the first the college has been closely linked with the Dominions; in each there is a reference committee which keeps the college in touch with its requirements and investigates the training of candidates for the membership examination. From each Dominion there is a steady stream of candidates and it is now difficult for anyone to obtain an appointment in a teaching hospital unless he has visited this country and obtained the M.R.C.O.G.

The membership of the R.C.O.G. is at present over 600. It would be much greater but for the fact that the college insists upon a long period of resident training before candidature. M.R.C.O.G. therefore denotes one who has been trained as well as examined, while a diploma is now offered to general practitioners who have had special post-graduate training in obstetrics. The college has issued several important memoranda and its advice is being asked increasingly by Government departments and others. While in professional matters it flourished from the start, in more material concerns it has had some tight corners to negotiate. Fortunately the late Lord RIDDELL was interested in the improvement of obstetrical training and showed his belief in the group of men founding the college by putting down a sum of money to cover the initial expenses. Then, for seven years, he gave the college an income of £1400 per annum, on the principle that it should be able to look after itself by the expiration of that time. Three years after its foundation, the first president (the late Prof. W. BLAIR-BELL) bought for the college its present house at 58, Queen Anne-street, and at his death he left a large sum of money to be used for encouraging research in obstetrics and gynæcology. While the college was still very young the Duke and Duchess of YORK, as they then were, showed their interest by visiting it and its new home was opened by the Duchess. Now King GEORGE has set his seal upon the college.

TREATMENT OF PELLAGRA

A LITTLE more than a year ago ELVEHJEM and his co-workers[1] reported the cure of black-tongue in dogs by the administration of nicotinamide prepared from yeast. This nutritional canine disease is developed on diets consisting largely of maize and resembling those associated with the occurrence of endemic human pellagra, so that the two diseases have been generally considered to have a similar ætiology. Nicotinic acid and other pyridine derivatives were immediately

[1] Elvehjem, C. A., Madden, R. J., Strong, F. M., and Wooley, D. W., *J. Amer. chem. Soc.* 1937, **59**, 1767.

tried in human pellagra, and although cases are relatively infrequent in autumn and winter reports of successful trials came swiftly. Within a month SPIES, COOPER, and BLANKENHORN [2 3] recorded the treatment of four human cases with nicotinic acid, using the subsidence of tongue and mucous-membrane lesions as the criterion of success. The patients were treated in hospital and received a controlled basal diet, on which alone the symptoms showed no improvement. Relatively large doses of nicotinic acid were given, 40–80 mg. by injection or 200–1500 mg. by mouth in a period of twenty-four hours. Almost simultaneously FOUTS, HELMER, LEPKOVSKY, and JUKES [4] reported the cure of four cases of alcoholic pellagra; these patients were also maintained on a "pellagra diet" in hospital, supplemented by 500–1000 mg. of nicotinic acid daily by mouth, and there was improvement in the mental condition, in the stomatitis, and in the intestinal disorders, as well as cure of the dermatitis. In addition, SMITH, RUFFIN, and SMITH [5] described a case which had suffered from recurrent pellagra for fifteen years, in which the mental symptoms showed improvement after forty-eight hours, and the skin symptoms within three days, when 60 mg. nicotinic acid was given daily by mouth. These results have been fully confirmed by more recent observations. SPIES, BEAN, and STONE [6] have written on the effect of treatment with nicotinic acid and its derivatives of 73 cases of endemic pellagra and 99 of "subclinical" pellagra, and they state that they "have not observed a case of acute pellagra that has not responded promptly to nicotinic acid therapy." In a special study [7] of 60 cases showing acute mental disorder, improvement was observed within periods varying from ten hours to six days after medication with nicotinic acid, the daily dosage being 500–1000 mg. by mouth or 100 mg. (given in five doses of 20 mg.) intravenously. Further confirmation comes from MATTHEWS,[8] who studied 13 cases of "classic" endemic pellagra kept on a pellagra diet; here also the mental disorder as well as the gastro-intestinal symptoms responded quickly to treatment with nicotinic acid. In our present issue good results with nicotinamide are reported by Prof. ALPORT and his associates.

In contrast to these successes is the failure of nicotinic acid to cure 16 chronic pellagrins reported by SCHMIDT and SYDENSTRICKER.[9] A control series of 17 cases received 90 g. of brewers' yeast daily, and after six weeks all of these showed general improvement, whereas the nicotinic acid group, after a temporary improvement, had all relapsed. The doses of nicotinic acid (100 mg. twice weekly) were, however, very much smaller than in the former studies, and the cases were treated as out-patients. In these two facts may lie the explanation of the failure.

The evidence that nicotinic acid is a specific cure for human pellagra and for the nutritional diseases produced by maize diets in dogs and pigs [10] thus seems overwhelming. The value of liver and yeast in the prevention and cure of these diseases has long been known, and it is reasonable to attribute their potency to the action of the nicotinamide they contain. But the results of RUFFIN and SMITH [11] do not support this conclusion. They found that, whereas crude liver products were effective in relatively small doses both in canine black-tongue and in pellagra, large amounts of more purified extracts, which were potent in the treatment of pernicious anæmia, were ineffective; the same was true of the residues discarded in the preparation of the extract. When, however, the ineffective doses of the extract and the residue were given together there was an immediate and dramatic remission of symptoms. Exactly similar results were observed in canine black-tongue by HARVEY and his associates.[12] These observations, which suggest that a combination of two substances is needed to correct the deficiency in diets inducing black-tongue and pellagra, are difficult to reconcile with the curative action of such simple substances as nicotinic acid and nicotinamide.

In considering the ætiology of endemic pellagra, developed on diets consisting largely of maize and maize products, it is obviously important to ascertain the content of nicotinic acid or amide in this cereal, as compared with that of other cereals or grains that are the staple components of various human diets. Such estimations have been published by SWAMINATHAN,[13] who found white maize (1·5 mg. nicotinic acid per 100 g.) the poorest of the series of grains examined, wheat (5·33 mg.) the richest, and rice (2·4–2·8 mg.) intermediate. In view of the great importance of these figures for appraising the nutritive value of the diets of different countries and races, confirmation of these results is badly needed; but so far no other studies have appeared.

PSYCHIATRY FOR FUTURE DOCTORS

THE teaching of psychiatry to undergraduates has not been one of the most admirable features of our system of medical education. Its defects have often been exposed, and attempts at improvement are being made; but there is much dispute and much delay. The dispute is not as to whether more instruction is desirable, but as to who shall instruct and what instruction he shall give. Some even maintain that the student should get his clinical teaching in this branch, not from the psychiatrist, but from physicians and surgeons. Psychotherapists, psycho-analysts, neurologists, psychologists, pædiatricians, all have their views,

[2] Spies, T. D., Cooper, C., and Blankenhorn, M. A., Paper read to the Central Society for Clinical Research, Chicago, Nov. 5th, 1937.
[3] Spies, T. D., *Lancet*, 1938, **1**, 252.
[4] Fouts, P. J., Helmer, O. M., Lepkovsky, S., and Jukes, T. H., *Proc. Soc. exp. Biol.* 1937, **37**, 405.
[5] Smith, D. T., Ruffin, J. M., and Smith, S. G., *J. Amer. med. Ass.* 1937, **109**, 2054.
[6] Spies, T. D., Bean, W. B., and Stone, R. E., *Ibid*, August 13th, 1938, p. 584.
[7] Spies, T. D., Aring, C. D., Gelperin, J., and Bean, W. B., *Amer. J. med. Sci.* October, 1938, p. 461.
[8] Matthews, R. S., *J. Amer. med. Ass.* Sept. 24th, 1938, p. 1148.
[9] Schmidt, H. L., Sydenstricker, V. P., *Ibid*, 1938, **110**, 2065.
[10] Chick, H., Macrae, T. F., Martin, A. J. P., and Martin, C. J., *Biochem. J.* 1938, **32**, 10.
[11] Ruffin, J. M., and Smith, D. T., *Sth. med. J., Nashville*, 1937, **30**, 4.
[12] Harvey, H. I., Smith, D. T., Persons, E. L., and Burns, M. V., *J. Nutrit.* 1938, **16**, 153.
[13] Swaminathan, M., *Nature, Lond.* 1938, **141**, 830.

coloured largely and contentiously by their own experience. All, however, would agree that a proper training would be designed not to make the young doctor a dilettante psychiatrist, but to enable him to appreciate and apply the psychiatric mode of approach to illness, to recognise the earlier stages of psychological trouble, and to understand pretty clearly the limitations within which he could help and the kind of help he could hope to provide. These are the aims admitted here, and rather more actively worked for in a few other countries, notably in the United States. The recently published proceedings [1] of the fourth Conference on Psychiatric Education, held in Baltimore in 1936, indicate how seriously—perhaps over-seriously—the nettle is grasped in many of the American medical schools.

A course spread over three or four years and occupying between 150 and 200 hours of the student's time is such a concession from the authorities controlling medical teaching as should appease even the most exigent psychiatrist. Indeed if it were not for the complexity of his subject and the known prolixity of his tribe he might regard 200 hours as a larger gift than he could make use of. Nevertheless several teachers of psychiatry at the conference were able to describe well-balanced undergraduate courses as long as this, in which actual case work played a proper part, and which ensured that the medical graduate would have when he qualified as good a working knowledge of psychiatry, especially in its non-institutional forms, as he has of medicine and surgery and other branches of his profession. He would also have learnt how difficult psychiatry is, and would have the same respectful but not uncritical attitude towards its procedures as he has towards, say, the techniques of the operating theatre or the laboratory. To attain such a standard, well-organised departments are essential, functioning as teaching centres, and with adequate clinical material and teaching staff: one man, however able, working in an out-patient clinic and a lecture room, cannot give a thorough training of the sort.

It is sometimes questioned whether these ambitious courses turn out better doctors, in respect of psychiatry, than our more cursory methods; but that will depend on the quality of the teaching, other things being equal. It is surely better for the student to have systematic guidance in understanding human emotions and social relationships, and to have clinical contact with the problems that present themselves in most cases of mental illness, than to be left to his own resources, aided by a text-book and some lectures and demonstrations (the latter sometimes of the kind that make it clear why psychiatrists used to be called alienists). Fortunately, there are now several medical schools here in which much more than this is offered to the student, but hardly any can be said to give time and attention proportionate to the time and attention that the doctor should later give to this branch of his daily work. He will not, of course, unless he receives post-graduate training, be a skilled psychiatric diagnostician, or a psycho-analyst, or an administrator of continuous narcosis and hypoglycæmic shock and such measures; but he ought to know how to remedy minor troubles, when to call in the specialist, and how to recognise the psychological side of his patients' ailments. The tentative, varied, and intelligent ways of fitting him for this, that are in use in some United States medical schools, are set forth in the proceedings of the Baltimore conference. They are set forth not only with enthusiasm, but also, for the most part, with an honest awareness of shortcomings.

ANNOTATIONS

GROWING PAINS

In the last ten years many rheumatic supervisory clinics for children have been established in London and other centres, and nowadays when a child develops vague aches and pains about the limbs he is apt to be sent to such a clinic on the grounds that it is better to treat rheumatism early than late. The lay public has at the same time been told that growing pains are mostly a form of rheumatism and that a child with growing pains is a potential victim of heart disease unless properly treated. At the fifth annual meeting of the American Rheumatism Association held in San Francisco this year M. J. Shapiro [2] opened a discussion on this important question of growing pains and their relation to sub-acute rheumatic fever. He analysed the histories of 100 children with well-developed rheumatic heart disease attending a special centre. In 84 of these there was, he said, a definite history of a major attack of rheumatic infection, either rheumatic fever or chorea, or both. In the remaining 16, though there was no history of a major attack, there was definite evidence of long-continued rheumatic infection, shown for example by low-grade fever, loss of weight, joint pains, transient skin rashes, increased sedimentation-rate, and pallor. In other words, these children were ill, and they formed a striking contrast to a second group of 200 children complaining of pains in the legs only. Such pain came on at the end of the day and often wakened the patient during the night. The pain very rarely occurred during the day and almost never in the arms. Otherwise these children were in good health without any of the symptoms of chronic infection outlined above, and none of them has since developed rheumatic heart disease. Shapiro's point is that normal growing children do suffer from growing pains, which can easily be differentiated from the pains of chronic rheumatic infection. Speakers in the subsequent discussion agreed with this view. The idea of labelling a child as "pre-rheumatic" was particularly condemned, and it was suggested that the case would be strengthened if there were evidence of the way in which growing pains were produced. Thus if it could be shown that the age-incidence of growing pains corresponded to a period of rapid growth of the legs and that children with growing pains were, in fact, growing rapidly, this

[1] Published by the National Committee for Mental Hygiene. New York. 1938.
[2] *J. Amer. med. Ass.* Nov. 19th, 1938, p. 1960.

would be a useful piece of evidence. In reply Dr. Shapiro said that this was being investigated.

SEMEN ANALYSES IN FERTILE MEN

THE analysis of the semen has become a sine qua non in the investigation of an infertile marriage. In order, however, that departures from fertility may be recognised, a standard of normality is essential. This is not easily established, since men whose fertility has been proved by their wives having become pregnant do not submit their semen to analysis. For this reason the semen analyses of 200 fertile men made by Hotchkiss, Brunner, and Grenley [1] are of great interest. The wives of these men were all in the first half of gestation. The fertilising value of semen seemed to depend on a combination of four basic factors: its volume; the number of spermatozoa present; their grade of motility; and the percentage of abnormal forms. In this series the average volume of semen was 3 c.cm. When a condom was used for its collection the volume was reduced, and the motility of the spermatozoa was at the same time impaired. In 25 of the cases the spermatozoa count was below the sixty million level. No constant relationship was found to exist between the amount of ejaculate and the spermatozoa count, but as a rule larger ejaculates gave higher counts. The authors consider that a determination of the *p*H of the semen is only necessary when spermatozoa motility is reduced, and that estimation of the sugar content of the semen is of no apparent value.

This paper is important for all who are interested in the question of male fertility and infertility. Rarely, if ever, has so good an opportunity been provided for studying the constitution of normal semen of proven fertility.

TYPING THE TYPHOID BACILLUS

TWO years ago Craigie and Brandon [2] of Toronto described a bacteriophage which was specific for the Vi form of *Bacillus typhosus*. In a follow-up of this work Craigie and Yen [3] elicited four serological types of Vi-specific phage, one of which, Phage 2, seemed to attack different strains of typhoid bacillus with varying intensity. This phenomenon was shown to depend on the fact that Phage 2, when propagated on a certain strain, develops a high lytic activity for that strain but not for other unrelated strains; extension of this observation resulted in the differentiation of a large collection of strains of *B. typhosus* into a limited number of groups, tentatively labelled Types A to J. A fairly simple technique has been devised for quickly assigning any strain to its appropriate type, and, as a result, 98·6 per cent. of 592 typable cultures have been allocated to one or other of six main types. Of over 700 cultures, many of them already frequently subcultured, only about a tenth could not be typed because they were "imperfect Vi forms," while a smaller proportion did not contain any Vi antigen. It now became essential to test the stability of these types and this was done in various ways—by picking a dozen or more colonies from one culture, by testing the same culture at varying intervals of time, by comparing cultures of the same strain maintained at different centres, and, lastly, by correlating the types with epidemiological data. The in-vitro tests failed to show any lack of type-stability, while from several cases and carriers one type and one type only was repeatedly recovered. A detailed analysis of the sources of the strains under examination showed an almost complete agreement between the epidemiological findings and the type of bacillus isolated from the individuals involved. The few discrepancies could be readily explained.

The significance of these observations is obvious. The isolation of the same type of *B. typhosus* from a carrier and a series of patients whom the carrier is suspected of having infected would add strong bacteriological support to the epidemiological evidence. The present investigation has, in fact, already given bacteriological backing to the evidence as to source of infection not only in numerous Canadian outbreaks but also in the recent Croydon and Bournemouth epidemics, by proving the identity of the carrier strain with strains derived from infected patients. No doubt this work will lead to a re-examination of the Vi antigen to see whether types of *B. typhosus* can be differentiated serologically. In the meantime the technique described by Craigie and Yen is one which, given the phage preparations, could be readily adopted in any up-to-date laboratory; the fallacies are few and the typing of freshly isolated strains of typhoid bacillus is likely to be both straightforward and speedy.

ANÆSTHETICS FOR ANIMALS

FEW people are aware of the amount of study that is given to-day to anæsthesia in veterinary surgery or of the wide extent and efficiency with which the results are being applied. In a paper read to the 13th International Veterinary Congress, J. G. Wright [1] reveals some of the difficulties confronting the anæsthetist who has to deal with animals as different as a horse and a cat. Compared with these, problems of meeting the requirements of the anæmic young housekeeper and the hard-drinking hunting squire seem simple. Moreover, animals of the same species show almost as great individual differences in reaction to narcotic drugs as do human beings. The barbiturates have proved even more useful in animal surgery than in man, though in the horse the huge doses necessary prohibit their use on grounds of cost. For this animal about five grammes of chloral hydrate so that the animal can be quietly cast, followed by open chloroform, appears to be the method of choice. For the dog Wright considers Nembutal the best anæsthetic for all extensive surgical procedures and recommends it also for the many minor operations which hitherto have been usually performed under morphine. It is interesting that animals, like human beings, are subject to excitement during recovery from barbiturate anæsthesia.

ANGIOCARDIOGRAPHY

IN the first issue of a new Havana medical journal Castellanos, Pereiras, and Garcia [2] describe their method of radiography of the heart and great vessels after the intravenous injection of opaque fluid. Angiocardiography is mainly applicable to congenital malformations in children, and can be used after death where a full post-mortem examination is refused. The best results are obtained in patients under twelve years, because their skeleton is not yet fully calcified and their blood volume is comparatively small, so that the opaque fluid is not too rapidly diluted. The patient is strapped on the X ray couch to prevent movement during screening, and a

[1] *Amer. J. med. Sci.* September, 1938, p. 362.
[2] *J. Path. Bact.* 1936, **43**, 233.
[3] *Canad. publ. Hlth J.* September and October, 1938, pp. 448 and 484.

[1] *J. comp. Path.* September, 1938, p. 166.
[2] Castellanos, A., Pereiras, R., and Garcia, A., *Rev. Cienc. méd., Havana*, July, 1938, p. 1.

cannula is tied into a vein. In another paper [3] Castellanos and his colleagues give their reasons for preferring an arm vein, which they have used in almost all their cases. By means of an electrically controlled apparatus the opaque solution (Perabrodil or Uroselectan) is run into the vein while the heart and great vessels are observed on the fluorescent screen. Conditions such as patency of the foramen ovale or ductus arteriosus, compression of the great vessels within the thorax, and the like can be diagnosed with precision. The results obtained are, however, of academic rather than practical value, and the procedure would be a terrifying ordeal for most children and not one to be lightly applied.

THE THYROID AND THE RED CELL

IDEAS about the part played by the thyroid gland in erythropoiesis have hitherto been extraordinarily confused. In making an important study of the anæmia encountered in myxœdema, Dr. Richard Bomford [4] has been led to examine the whole problem of the rôle of the gland in red cell production. He found three types of anæmia in association with myxœdema. The first is the simple hyperchromic type which he regards as the uncomplicated anæmia of myxœdema: it is never severe, the colour-index being normal or slightly over ninety; there is some macrocytosis but no poikilocytosis and no excessive anisocytosis; red cell fragility in saline is increased; the reticulocyte count is usually normal though it may be raised; the serum bilirubin level is normal; and gastric function is variable. This anæmia responds slowly but surely to thyroid medication and is unaffected by liver or iron. The second type is the hypochromic anæmia, which Bomford attributes to iron deficiency associated with myxœdema: it responds to a combination of iron and thyroid, though neither is alone effective, and except in respect of cell size it closely resembles the anæmia caused by ordinary iron deficiency; there is never any microcytosis and macrocytosis is common. The third type is an Addisonian hyperchromic anæmia in which Bomford postulates a deficiency of the pernicious-anæmia principle associated with thyroid deficiency, since such cases require treatment with both liver and thyroid. His observations suggest that cases both of the hypochromic and Addisonian type can be converted into the simple hyperchromic type by treatment respectively with iron alone or liver alone.

Bomford advances the following hypothesis to explain the relationship between the thyroid gland and erythropoiesis. In the simple hyperchromic anæmia there is no evidence of dyshæmopoiesis, and therefore, he holds, thyroxine is not utilised in the bone-marrow. In response however to the lowered basal metabolic rate and therefore to the decreased needs of the tissues for oxygen, he believes, there is a partial atrophy of the erythron. The adaptation is analogous, in his opinion, to that seen in animals exposed to an increased tension of oxygen. If this is so, thyroid exerts only an indirect action upon erythropoiesis through its effect on basal metabolism. This attractive hypothesis does not, however, explain why the red cells found in the characteristic anæmia of myxœdema, the simple hyperchromic type, are more fragile than normal cells. The criteria accepted for the diagnosis of myxœdema in certain of the case reports quoted might also be questioned; but Bomford's paper nevertheless presents the clearest picture yet available of the anæmias found in this condition and gives a reasoned guide to correct therapy.

[3] Castellanos, Pereiras, and Garcia, *Pr. méd.* Oct. 5th, 1938, p. 1474.
[4] Bomford, R. R., *Quart. J. Med.* 1938, **7**, 495.

HYPERTENSION, NEPHRITIS, AND SALT

AMONG clinicians it is thought that there is a relationship between the intake of salt and the arterial blood pressure, and hyperpiesis is often treated by limiting the amount of salt in the diet. It has never been very clear why the small reduction in the volume of the blood and extracellular fluids brought about by this means should have any effect, since it has been shown that severe salt deficiency, experimentally induced, does not lower the normal person's arterial tension,[1] and the ingestion of salt by normal persons has little or no influence upon the blood pressure. It has, however, recently been found that the administration of sodium chloride to patients with nephritis may increase both the systolic and diastolic blood pressure very considerably,[2] and it appears that the effect upon the blood pressure may in some way be bound up with the nephritis. This is borne out, and in part explained, by the work of Verney and Vogt,[3] who have shown that when a chronic high blood pressure has been induced in dogs by partial occlusion of the renal artery, the hyperpiesis is enhanced by the administration of sodium chloride. This happens only if the kidney is already abnormal, and the amount of pressure-raising substance secreted by such kidneys evidently varies with the amount of work they are called upon to do. Verney and Vogt's observations provide a rational basis for the treatment of hypertension and nephritis with diets that throw as little strain as possible on the kidneys, but they demonstrate also that persons with normal kidneys and arterial pressures may take as much salt as they choose without fear of inducing a high blood pressure.

ENCEPHALOGRAPHY BY THE METHOD OF LARUELLE

VENTRICULOGRAPHY and encephalography are invaluable diagnostic measures, but unfortunately—apart from a certain small risk to life—each has its special disadvantage. Ventriculography necessitates a minor surgical operation; and encephalography, although simpler, is usually followed by headache, vomiting, pallor, sweating, and tachycardia. Indeed the patient may be prostrated with the pain and with shock-like symptoms proportional to the amount of the air-replacement. Consequently any modification of these methods of investigation which will still give useful information but is not followed by unpleasant symptoms deserves a careful trial.

Fractional encephalography, in which only 20–30 c.cm. of cerebro-spinal fluid is replaced by air, usually produces adequate filling of the lateral and third ventricles. Weinbren [4] describes his experiences with Laruelle's method, in which the replacement is of the order of 5–10 c.cm. Such a small amount of air does not fill the ventricles; but, since it rises to the highest parts of the system when the patient is erect, a postero-anterior radiogram will demonstrate the positions of the lateral and third ventricles and their relation to the median plane. Departures from the normal appearance—due to a tumour or gliosis—

[1] McCance, R. A., *Lancet*, 1936, **1**, 823.
[2] Barker, M. H., and Robinson, R., *J. Amer. med. Ass.* Nov. 19th, 1938, p. 1907.
[3] Verney, E. B., and Vogt, M., *Quart. J. exp. Physiol.* 1938, **28**, 253.
[4] Weinbren, M., *Brit. J. Radiol.* November, 1938, p. 705.

will comprise an asymmetrical position of the three ventricles, displacement, or absence of filling of one lateral ventricle. Such a small quantity of air merely indicates the position of a ventricle and seldom gives any information about its size and shape; hence the use of only one projection, in the sagittal plane. Reactions are usually absent or minimal, and the procedure is carried out in the out-patients' department.

Weinbren assumes "that any pathological condition would disturb the relationship of one or other of the three superior ventricles in relation to the various base-lines." Unfortunately, experience has shown that in some cases this assumption is not justified. Pennybacker and Meadows [5] have reported cases of cerebral tumour in which the ventriculograms appeared normal, and other workers have had similar experiences. It seems reasonable to believe that Laruelle encephalograms will be more liable to mislead the clinician and to appear normal in some cases in which more complete air-replacement might show deviations from the normal. Weinbren evidently is fully aware of this risk, for he regards the method as the first line of investigation, not necessarily replacing fuller examination of the ventricular system. Encephalography with such small quantities of air deserves full exploitation, and the results of a large series of cases should be collected to determine its usefulness.

SKIN REACTIONS IN PNEUMONIA

DURING the past seven years several observers have studied the reactions that follow the intradermal injection of purified pneumococcal polysaccharides in normal human subjects and in patients suffering from pneumonia. Most of the observations have been carried out with polysaccharides prepared from type I and type II pneumococci. Two types of reaction have been noted, an immediate weal and flare, developing within 15–30 minutes, and a delayed reaction which may show varying degrees of erythema or infiltration. Experience has shown that the specific and significant reaction is of the "immediate" or "primary" type, and a "positive" skin test to a particular pneumococcal polysaccharide has come to mean a reaction of this kind.

The results that have emerged from these studies may be summarised as follows. A varying proportion of normal adults, ranging from about 20 to 75 per cent. in different series of observations, have been found to react positively to the intradermal injection of type I and type II polysaccharides. Possible differences in the purity of the reagents employed, and in the criteria adopted in reading the reactions, make it difficult to assess the exact significance of these findings, but it seems clear that an appreciable proportion of normal adults have developed a skin sensitivity of this kind to these two polysaccharides, and particularly to type II. In patients acutely ill with pneumonia the skin reaction to the polysaccharide derived from the infecting type of pneumococcus is usually negative. The reaction changes from negative to positive at about the time of the crisis, and if the patient is treated with a specific antipneumococcal serum the resulting clinical improvement is associated with the same change from negative to positive in the skin reaction. The occurrence of a positive skin reaction appears to be constantly associated with the presence of specific antibodies in the patient's blood; and the test has therefore been used to control the therapeutic administration of antipneumococcal serum. Patients who die commonly show a persistently negative reaction. It seems probable that the test depends in part on an adequate tissue reactivity, since in some fatal cases the skin reaction has remained negative in spite of the presence of circulating antibody.

MacLeod, Hoagland, and Beeson [1] report from the hospital of the Rockefeller Institute a series of observations on 104 cases of pneumonia, caused by types I, II, III, V, VII, or VIII, which afford valuable additional data. All these cases were treated with a specific antiserum. In all cases a skin test with the homologous polysaccharide was performed before administration of the serum, and in those cases in which this test was negative (91), further skin tests were employed to control the treatment. Of these 91 patients 81 recovered, and in 80 of these the skin test changed from negative to positive after the administration of serum. There were 10 fatal cases, and in 5 of them the skin test had remained persistently negative in spite of administration of serum. Of the other 5, in which the skin test changed from negative to positive, it became negative again before death in 3 cases; and of the remaining 2 patients 1 died of a vascular accident six weeks after admission. The 13 who gave positive skin tests before receiving serum all recovered. The investigators conclude that repeated skin tests are of great value in controlling serum treatment. They emphasise that the polysaccharide preparations used must be highly purified if non-specific reactions are to be avoided; and they note that such reactions may be of the immediate variety, and very difficult to distinguish from the characteristic reaction with the specific polysaccharide.

HEART VALVES IN ENDOCARDITIS

AT a meeting reported on p. 1470 of this issue it was mentioned that in cases of old rheumatic disease the cusps and ring of the aortic valve are usually vascularised with capillaries and muscular arterioles. It is now generally agreed that the heart valves are normally avascular structures, and that the blood-vessels that appear in them in endocarditis are a part of the morbid process. Harper,[2] by injecting dyes into hearts post mortem and subsequently clearing the tissues by Regan's method, has demonstrated very clearly the ingrowth of new blood-vessels into valve leaflets both in human endocarditis and in the experimental valve lesions produced in rabbits by intravenous injections of aleuronat. The new vessels penetrate from the base of the affected cusp and from the papillary muscles to the site of the lesion, apparently in much the same way as capillaries penetrate the walls of a thrombosed blood-vessel. It must not be assumed that this observation has any necessary bearing on the pathogenesis of endocarditis. Leary [3] and many others have shown fairly conclusively that rheumatic endocarditis is in the first place a non-vascular fibrocytic reaction in the sub-endothelial connective tissues of the valves, and that the vascularisation is a later effect. But it may be said to have some bearing on the old question raised by Koster in 1878 as to whether or not lodgment of bacterial emboli in the substance of the heart valves is responsible for infective endocarditis, because the vascularisation in rheumatic endocarditis would naturally make this possible. Most authorities, however, have rejected this idea entirely, since, as Gross and Fried [4] and

[1] MacLeod, C. M., Hoagland, C. L., and Beeson, P. B., *J. clin. Invest.* November, 1938, p. 739.
[2] Harper, W. F., *J. Anat.* October, 1938, p. 94.
[3] Leary, T., *Arch. Path.* 1932, **13**, 1.
[4] Gross, L., and Fried, B. M., *Amer. J. Path.* 1937, **13**, 769.
[5] Pennybacker, J., and Meadows, S. P., *Lancet*, 1938, **1**, 186.

others have pointed out, bacterial endocarditis is not so much an interstitial process in the valves as an implantation of bacteria on their surfaces. There seems much to be said for the idea that simple rheumatic endocarditis is something in the nature of a connective tissue hypersensitivity reaction, as suggested by Birkhaug,[5] by Swift, Derick, and Hitchcock,[6] and by Zinsser and Yu,[7] and that bacterial endocarditis is a superinfection on a previously damaged valve surface. The previous damage may consist of a rheumatic endocarditis or of some congenital or acquired valvular defect, for, as Gross and Fried have suggested, any of these conditions may provide a suitable anchorage for any transient bacterial invaders from the blood stream.

THE VOLE IN THE STUDY OF TUBERCULOSIS

IN 1937 Wells reported in this journal [8] an investigation of tuberculosis in wild voles (*Microtus agrestis*). The animals, which had been trapped alive by the field service of the Bureau of Animal Population at Oxford, came from seven different stations in the British Isles, and 134 of them were found to have macroscopic tuberculous lesions in which acid-fast bacilli were demonstrated. Wells thought that this acid-fast bacillus was probably a *Mycobacterium tuberculosis*, but its taxonomic position had not been determined. He has now followed up his observations by an inquiry into the susceptibility of voles to human and bovine strains of tubercle bacilli,[9] using animals bred in captivity for some years. The human strain of tubercle bacillus, he says, produced demonstrable lesions one month after intraperitoneal injection with at least 1 mg. of culture, but the bovine strain caused extensive and progressive disease with much smaller amounts—sometimes as little as 0·0 0001 mg. He accordingly suggests that the vole may be employed for distinguishing the two strains; a test dose of 0·001 mg. of moist culture of tubercle bacilli injected intraperitoneally should without fail give the answer in a month. There is a considerable mortality from intercurrent diseases among voles kept in captivity, but with attention to details of diet and housing these might be overcome.

ANIMAL WELFARE

IT was a lucky day for the "Cinderella of the professions" when young Hobday, half a century ago, decided to join it. No Cinderella could have had a more faithful Prince. His enthusiasm permeates his book [10] which tells of what has been done for sick animals. Through veterinary science, glanders and rabies have been eradicated from this country, distemper made preventable, and foot-and-mouth disease brought under control. Much however remains to be done, and in view of the number of diseases transmissible from animals to man closer liaison is still required between the medical and veterinary professions—e.g., the endowment of one or more university chairs in comparative medicine. Sir Frederick has much to relate of the dangers of veterinary quackery and of the disreputable tricks, such as "beaning" and "bishoping," of a certain type of horse-coper. Equally interesting are his war reminiscences and his scarcely credible tales of animal intelligence. He writes of past and present cruelties to animals and rightly condemns steel-gins but, like others, offers no better alternative than cyanogen fumigation which has but a limited sphere of usefulness. The most heartening chapter to many will be that which describes the resurrection of the Royal Veterinary College, in which the author played so large and energetic a part. This book is to be commended alike to doctors, veterinarians, and all who have at heart the welfare of the other animals.

[5] Birkhaug, K. E., *J. infect. Dis.* 1927, **40**, 549.
[6] Swift, H. F., Derick, C. L., and Hitchcock, C. H., *J. Amer. med. Ass.* 1928, **90**, 906.
[7] Zinsser, H., and Yu, H., *Arch. intern. Med.* 1928, **42**, 301.
[8] Wells, A. Q., *Lancet*, 1937, **1**, 1221.
[9] Wells, A. Q., *Brit. J. exp. Path.* October, 1938, p. 324.
[10] Fifty Years a Veterinary Surgeon. By Sir Frederick Hobday, C.M.G., F.R.C.V.S., F.R.S.E., hon. veterinary surgeon to H.M. the King; president of the University of London Animal Welfare Society; late principal and dean of the Royal Veterinary College, London. London: Hutchinson and Co. 1938. Pp. 288. 10*s.* 6*d.*

THE staff of the Westminster Hospital is proposing to hold in the New Year clinico-pathological demonstrations open to all qualified practitioners and senior students of medicine. They will be given at the hospital on alternate Tuesday afternoons at 5 P.M., the first on Jan. 3rd in the Meyerstein lecture theatre of the new medical school in Horseferry-road.

"WHO'S WHO" for 1939 is the ninety-first yearly issue of this well-known book of reference for details of living people. In the last three years the number of pages of biography has decreased by nearly 200, but the increased size of page converts this apparent loss into a gain equivalent to about 125 of the old pages. The rapid multiplication of human activities provides more and more opportunities for attaining a modest eminence—especially in the official and unofficial bureaucracies—and so long as it remains easy to handle, users of "Who's Who" will be grateful for its increasing comprehensiveness. The volume is published by A. and C. Black, Ltd., at 63*s.*

AT a recent staff meeting of the Mayo Clinic Dr. E. B. Tuohy [1] described the employment of local anæsthesia in operations on the anus, rectum, and perineum. In these the best results seem to follow the use of Metycaine and epinephrine solution, a combination which has been little tried by British surgeons. It is claimed for metycaine that it produces analgesia more quickly than procaine, its effect is more lasting, and its toxicity is no greater.

[1] *Proc. Mayo Clin.* Oct. 19th, p. 657.

THE LANCET 100 YEARS AGO

Dec. 22nd, 1838, p. 491.

From a leading article on Joyce's patent charcoal stove, which was suspected of causing the death of James Trickey.

Upon the 12th of May last we spoke of the stove which JAMES TRICKEY died in watching, as "the Jerusalem Coffee-house bubble, JOYCE'S charcoal arcanum, and patent chafing-dish for heating apartments economically, and poisoning the inmates gratis, with the products of combustion." . . . Is it necessary, in the present day, to ask whether charcoal fumes are injurious, after thousands of deaths have been recorded from that cause? Are not charcoal fumes resorted to by suicides in Paris as frequently as the pistol or the dagger? . . .

Mr. JOYCE has a *great number of ladies and respectable families, now living*, ready to come forward and substantiate the fact that the stove is quite innoxious, from the nightly use of it in their bed-rooms. . . . If Mr. JOYCE be the prudent man we take him to be, he will not lose a day in obtaining their written evidence, for who knows what a night might bring forth where the Jerusalem Coffee-house stove is in use? . . . The families that persist in the use of JOYCE'S stove should give notice of their intentions to the *Humane Society*, and, if the officers of that excellent Society act with promptitude, they may probably restore some victims, to swell the grateful train at the next anniversary dinner.

SPECIAL ARTICLES

THE FEET OF THE INDUSTRIAL WORKER

At a meeting of the Association of Industrial Medical Officers, held on Oct. 28th at the London School of Hygiene, the feet of the industrial worker were considered from various aspects—viz., Physiological, Functional, Clinical, Remedial, and Industrial. The speakers were Dr. E. P. Cathcart, F.R.S., regius professor of physiology, University of Glasgow, and chairman of the Industrial Health Research Board; Mr. C. Lambrinudi, orthopædic surgeon to Guy's Hospital, London; Mr. W. Sayle Creer, orthopædic registrar, Salford Royal Hospital; Dr. William Blood, medical officer, J. Lyons and Co., Ltd.; and Mr. H. Bradley, director of research, British Shoe and Allied Trades Research Association. Their remarks are here reproduced in slightly abridged form.

Physiological Aspect: Nature of Foot Incapacity

(E. P. CATHCART, M.D., F.R.S.)

Since sufferers from definite defects of the feet, such as talipes, either congenital or secondary, are unlikely to be recruited for most industries, and although other lesions, from simple corns to hallux valgus with its commonly associated bunion or hammer-toe or painful osteo-arthritic lesions, can cause pain, probably the defects which most commonly affect the feet of industrial workers are lesions associated with, or believed to be associated with, distortion of the arches and usually called flat-foot.

There is no definite *normal* arch. A relatively low longitudinal arch may exist without any associated pain, and a relatively high arch may develop pain on standing. The foot consists of an arch of bones knitted together by ligaments and held in position by strong muscular chords. Obviously, then, the arch may give way for two alternative reasons: (1) the ligaments have lengthened and the muscles, unable to bear the increased strain, give way; or (2) the muscle power has diminished, the tension fails, and the arch gives way. Possibly it is when the ligaments and the muscles reach a stage of unstable equilibrium, long before flat-foot is manifest, that there develops a common and often painful condition characterised by stiffness or loss of flexibility of the foot.

FOOTWEAR AS A CAUSE OF FOOT TROUBLE

It is customary to blame the footwear for a great deal of this foot incapacity. Such blame is at times fully justified, but it cannot wholly be laid at the door of faulty footwear. Even if the desire to conform with fashion were entirely got rid of, and if people were fully persuaded to accept some so-called anatomically and physiologically correct form of shoe, foot incapacity would not disappear. If footwear were alone to blame, why is it that the feet of peoples who are in the habit of going barefoot are often so far removed from what is looked upon as the correct or ideal foot?

Personally, I incline to the belief that many of the incapacities of the feet are in the first place due not to inherent weakness in the articulations of the foot, but to muscular weakness, atrophic or atonic conditions arising either from the lack of proper exercise or to a sluggish circulation. As much attention should be devoted to the musculature, not only of the feet and lower limbs but of the body generally, as to the footwear. The atrophic or atonic state of the muscles may arise from the fact that little or no exercise is taken; that the diet is inadequate which in turn may be due to inability to purchase the necessary foodstuffs; to the improper distribution of the expenditure—dress taking precedence over food; or to the fact that the food intake is deliberately restricted for the purpose of slimming.

Ill-fitting, ill-shaped, and ill-ventilated shoes do, of course, play a part in the development of foot incapacity, especially of the toes. High heels are a direct cause of defect. The whole posture is wrong, the disturbance of the centre of gravity, the pushing forwards and downwards of the toes into a narrow pointed cavity, the loss of flexibility of the foot, and the stilted gait, all are wrong. But after the body and feet are adapted to the abnormal position and movement, there seems to be little complaint by the wearers, so long as the abnormal type of footwear is adhered to. Trouble arises apparently when there is alternation between high and low heels, when the musculature has to adapt itself to different degrees of tension. Beyond the fact that such shoes tend to fix the muscles and thus hinder circulation, it is difficult to imagine what worse results follow their adoption as compared with the use of shoes of the same form, but with low heels. Is it not rather the tightness of the fore part than the height of the heel which is primarily at fault? It must not be forgotten, however, that there may be much distortion of the toes without excessive complaint either of pain or discomfort.

OCCUPATIONAL FACTORS

It is unavoidable that in certain forms of occupation, especially among those in whom the musculature is least developed and who are not in receipt of the highest incomes, long periods of standing are part of the daily routine. The real attack should be directed towards prevention. Unless any specially designed footwear, even if it conform with all scientific requirements, to be worn on duty is going to be suitable for outdoor use and will conform with what is regarded as fashionable, the position will not be materially improved. Fashion and vanity are the enemies to be conquered.

Improvement in footwear will be of particular value among thoughtful and older people who think more of comfort than of fashion, but it will not even here wholly solve the problem. The general state of health will still be a factor. More attention should be directed to physical exercises devised to strengthen the musculature not only of the feet, but also of the lower limb in particular and of the body in general.

Functional Aspect: Action of the Foot Muscles

(C. LAMBRINUDI, F.R.C.S.)

I will attempt to describe the physiological anatomy of the foot, emphasising particularly the function of the toes. The more one studies the problem, the more one is convinced of the key position held by the toes. As regards function the foot can be divided into three parts: outer, inner (Fig. 1) and forepart. The outer part lies flat on the ground, gives a bigger weight-bearing surface, and gives stability and balance with the aid of the fourth and

fifth toes. It is essentially a balancing organ, whereas the inner portion is essentially a lever (Fig. 2). I therefore deprecate indiscriminate amputation of the fifth toe. Given freedom the little toe is a very valuable organ and should never be removed without very adequate reason.

If the inner part of the foot were only a lever, we would be as well off if it consisted of only one bone, and if this were strong enough it need not even be arched. But the inner part is designed to be not only a lever, but also a spring to absorb shock. For this reason it consists of several bones, and some form of arch is essential because the only way in which a lever consisting of several segments can be made rigid is for these segments to arrange themselves into an arch with a bow-string base (Fig. 3).

The way the arch is formed is interesting. When standing the inner part of the foot is flattened. On taking a step forwards the tibialis anticus first contracts and lifts up the inner part of the foot. Simultaneously the tibialis posticus on the inner and the peronei muscles on the outer side contract and by their action lock the astragalus, os calcis, scaphoid, and cuboid bones firmly, so that viewed from the side the arch appears to consist of two bones: those already mentioned, locked together as one, and the metatarsal bones. These two elements of the lever are joined together by the cuneiform bone, which has no separate muscles attached to it. The joints between the scaphoid and cuneiform and between the cuneiform and metatarsals are therefore weak links. Support, however, is given to these by the bowstring action of the flexor longus digitorum and all the small muscles arising from the os calcis and inserted into the toes. Thus we see the important part played by the toes in preserving the rigidity of the lever during propulsion. The best way to appreciate the invaluable action of the toes in relation to the foot is to regard them as the fixed point for the action of the flexor muscles (Fig. 4).

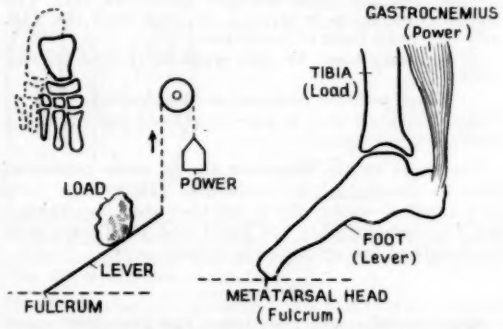


FIG. 1—Diagram showing longitudinal division of foot into inner part acting as lever and outer part acting purely as a balancing organ.

FIG. 2—Diagram showing mechanism of foot as lever of second order—i.e., with weight between fulcrum and power.

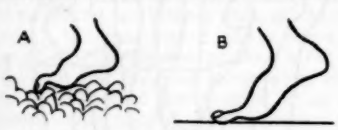


FIG. 5—Showing A, prehensile action, and B, ambulatory action.

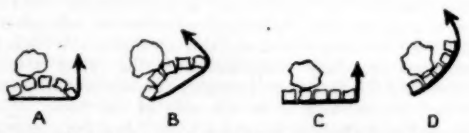


FIG. 3—Showing A, B, how a lever consisting of several segments can be made rigid if segments are arranged as an arch with a bow-string base; C, D, what happens if there is no arch.

PREHENSILE AND AMBULATORY ACTIONS

The toes are just as indispensable in relation to the fulcrum and are so complicated—i.e., consist of several phalanges and are controlled by a highly specialised neuromuscular mechanism—because primitive man had to walk on all kinds of surfaces: hard, soft, smooth, and irregular. Leverage cannot come into play unless the fulcrum is stable; so in walking bare-foot on soft or irregular ground the toes flex and grip the ground. This is the prehensile action (Fig. 5A). But in walking on hard smooth surface, to which civilised man is accustomed, there is no need to stabilise the fulcrum, for it is already stable. It is, however, necessary to prevent the fulcrum from wear and tear—i.e., to prevent too much pressure from falling on the metatarsal heads. We all know the inevitable metatarsalgia associated with claw toes. To prevent this the toes are kept straight and firm on the ground, so that the pressure is distributed not only on the metatarsals but also on the whole area of the toes. This fulcrum-preserving action is called the ambulatory action of the toes as opposed to prehensile, and in civilised society, because of smooth roads and pavements and our habit of wearing shoes, it is the more important of the two (Fig. 5B). When the toes are straight and firm on the ground, the flexor tendons, lying under the metatarsal heads, act as a sling and thus help to distribute weight. But, unless there were some very special provision made, every time the flexor tendons contracted the terminal phalanges would flex. For this reason the toes are provided with intrinsic muscles—i.e., interossei and lumbricales—which in the ambulatory action contract synergically with the flexor tendons of the toes and keep the phalanges straight and firm when the flexor muscles contract (Fig. 6). On the

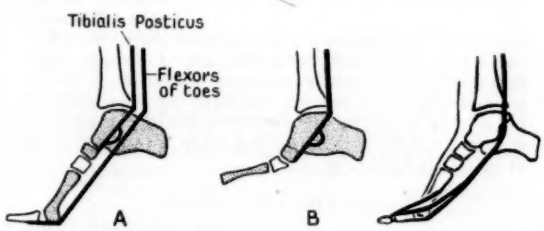


FIG. 4—Diagrams showing: A, division of arch into two segments when tibialis posticus is in action; potentially weak points at cuneiform joints; and bow-string action of flexor tendon of toes; and B, breaking strain at cuneiform joint when bow-string action of flexor tendon is removed.

FIG. 6—Diagram showing sling-like action of flexor tendons on metatarsal heads and how intrinsic muscles keep phalanges straight when flexor muscles contract.

other hand, when the toes act in a prehensile manner the action of the interossei muscles is inhibited; otherwise the toes could not flex and grip the object. One thus sees how complicated is the reflex action controlling the toes; presumably the afferent impulse arises from sensations in the sole of the foot. The stimulus of a hard or irregular object is a deep sensation and causes inhibition of the interossei muscles, whereas the stimulus of a smooth surface is a superficial sensation which causes the interossei to contract synergically with the flexor muscles of the toes. I believe this possibly explains why women suffer so much more than men from metatarsalgia. I do not think it is due to high heels so much as thin soles. If the sole of the shoe is thin enough for the foot to be able to perceive the irregularities of the ground, it would stimulate them to flex when walking instead of being straight (Fig. 7).

FIG. 7—Showing: A, effect of thin soles in stimulating toes to contract when stepping on an irregularity, thus allowing all the weight to come on to the metatarsal heads; and B, effect of thick sole—i.e., surface is always smooth for foot, however irregular the ground.

PRACTICAL APPLICATIONS

Our appreciation of the importance of paying more attention to the afferent side of the reflex arc led us, at Guy's Hospital, to be the first teaching hospital in London to appoint a chiropodist to work in our orthopædic clinic. In the presence of a painful focus, whatever it may be, it is impossible to re-educate the muscles of the feet and toes. The chiropodist is the eradicator of nociceptive impulses, and he is, in my opinion, an essential member of an orthopædic team.

The practical application of all these considerations has led me to develop a method of treating metatarsalgia due to claw toes, whether congenital or due to inadequacy of the intrinsic muscles, by arthrodesing all the interphalangeal joints of all the toes—in other words, to convert the toes into one phalanx instead of three. The only reason why we have interossei muscles is because our toes have several phalanges; so, if these muscles are paralysed, we can dispense with the need for them by converting the toes into one bone. The only function that is lost is the prehensile action, but this is a comparatively small price to pay for the preservation of the three other functions—namely, balancing, enlarging the area of the fulcrum, and the bow-string action on the arch of the flexor muscles of the toes.

Clinical Aspect: Relation to Footwear

(W. SAYLE CREER, M.Ch.Orth., F.R.C.S.)

THE problem as regards feet to-day is not one of pes planus or flat-foot—i.e., one involving the supporting muscles—but of forefoot deformities. My experience has been a dual one. At two hospitals I see very many fractures (about 2000 a year) as well as orthopædic cases. In this group I see the effects of industry on feet in the form of accidents. At two foot hospitals I hold orthopædic clinics at which I gain an experience of foot deformities. These are factors which affect industry and the efficiency of the workers.

FRACTURES

At Salford Royal Hospital we see between four hundred and five hundred fractures of the toes and metatarsals each year. Besides these there are the more severe foot injuries, of which a crush fracture of the os calcis must be mentioned as a typical industrial fracture. As regards these small fractures, the following facts emerge:—

(*a*) Nearly all the affected individuals are males (whereas deformities affect mostly females).

(*b*) Very few have deformities of the feet; in fact most male workers have very good feet.

(*c*) Most of the accidents are caused by dropping weights on the feet.

(*d*) Colliery workers wear boots with protected toe-caps, and we see very few cases from the pits.

(*e*) One firm in Manchester has introduced strengthened toe-caps and has found that the number of fractures has been reduced almost to nil. The cost of these boots is 6*s*. 11*d*., 8*s*. 11*d*., and 10*s*. 11*d*. only—a cheap form of insurance.

(*f*) Industry loses by the workers' period of disability.

(*g*) There is little permanent disablement.

(*h*) Nearly all this is preventable at the cost of a little thought only.

The more severe fractures are no more numerous than in non-industrial accidents. They may have permanent disabling effects, but they are "inevitable," and the responsibility for rapid and good cure is in the hands of the orthopædic surgeon only.

DEFORMITIES

Some months ago I analysed the first 1000 cases seen at the orthopædic clinics of the two foot hospitals. The patients were seen in less than two years and had been referred by the chiropodists to my clinics for surgical advice, being considered too complex for straightforward chiropody. The following brief facts are important.

(*a*) There were fifteen females to each one male.

(*b*) 33 per cent. had abnormalities of the forefoot, of the hallux valgus and metatarsal arch defect type; 20 per cent. acquired flat-foot, 10 per cent. hallux rigidus, and 4 per cent. hammer-toes. The remaining third had severe corns, ingrowing toe-nails, onychogryphosis, arthritis, or other conditions.

(*c*) Although the "forefoot group" were mainly of

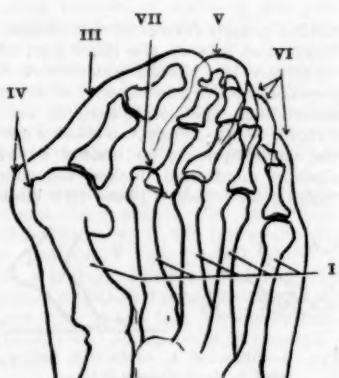


FIG. 1—Forefoot deformities. I, spreading and fanning of metatarsals; III, valgus deformity and rotation of hallux; IV, exostosis and bunion; V, overriding or underlying or hammer second toe; VI, underlying toes from shoe pressure—with corns; and VII, dislocated metatarso-phalangeal joint—one or more are dislocated in 8 per cent. of these cases.

middle age, far too many were under thirty, and one patient with severe hallux valgus was a girl of only thirteen years.

(*d*) This "forefoot group" is to-day's problem.

(*e*) Flimsy shoes with heels too high (Fig. 3) and toes too pointed (Fig. 2) are the usual footwear. There is ample evidence that ill-fitting shoes are the deforming factor par excellence (Creer, *Brit. med. J.*, July 2nd, 1938, p. 5).

(*f*) Many feet require operation, but very many can be relieved by chiropody, protective padding, and suitable shoes.

These female patients seldom come for advice because of a deformity. I am beginning to think that the poorer and middle classes regard it as normal to have deformed feet (Fig. 1). But they come because of pain. Pain is the symptom not only of hallux valgus, but also of hammer-toes, hallux rigidus, claw toes, and corns.

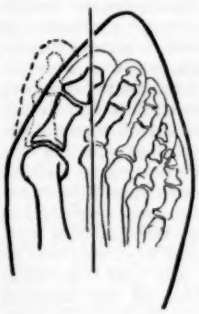


FIG. 2—Tracing of a radiogram of a foot in a shoe, showing that pointed shoes prevent the great toe from being kept straight, and that the point of the shoe is lateral to the middle line of the foot.

FIG. 3—Tracing of a radiogram of a foot in a high-heeled shoe, showing the vertical position of the metatarsals, almost certainly the essential factor in the production of forefoot deformities.

And all these conditions affect the forefoot. The figures given above show that about 70 per cent. of the patients have these troubles compared with the 20 per cent. of flat-foot cases. That is why I assert that flat-foot is not the problem to-day, but that forefoot troubles are.

The site of pain is usually in the skin. The causes of the pain are corns, callosities, and bunions. These are produced by the intermittent pressure of shoes which fit only where they touch. You see, I cannot get away from footwear. It needs no imagination to realise the effect of such pain. Not one of us could perform even a sedentary job with concentration and efficiency if our bunions were like a ball of fire and we experienced an intense stab in the little toe at each step. We can regard the subject from the viewpoint of the wearied mother, wife, or worker, from that of the surgeon anxious to relieve a sufferer, or from that of the director of an industry worried about the output per person. But we cannot ignore it.

SHOES

When we consider footwear, we must take into account the following facts. The worker wants something cheap and fashionable. The bootmaker and retailer wants a good selling line. The orthopædic surgeon reflects dispiritedly on the ravages of unsuitable shoes. It is slowly reaching the minds of many different groups of the nation that there is a shoe problem.

Originally our ancestors walked barefoot. Then they fastened on a flat stone, piece of wood, or the like, to protect the feet from cuts. In either case the foot trod on a flat surface and was not constricted. The muscles had full play, and there was no deforming force. As time went on, footwear was made to look neat, but it was essentially a flat sole-piece fixed to the foot by a non-constricting upper part. Heels were introduced to assist the riders of horses (cf. cowboys' high heels). Fashion dictated very long pointed toes, which were gradually reduced in size as our modern simplicity in dress came into vogue.

Fashion and vanity took a hand in modifying still further our ladies' shoes to make the foot dainty (cf. China's bound feet). In the days of hand-made shoes there was still some real attempt at fitting the feet. To-day mass-produced machine-made shoes mean that thousands of exactly similar shoes of each size are produced. We are expected to wedge our feet into relatively resistant coverings and to force them to conform with the shape of the shoe. It is said that the well-fitting shoes will not sell. It is admitted that there is no difficulty whatever in producing them. They are costly to-day simply because they are not mass-produced on account of the small demand.

My points for a good shoe are as follows:—

(1) It must grip the heel firmly.

(2) The forepart (vamp or toe-cap) must be large enough to accommodate the toes freely and be a little more anatomically correct than the foot it is to fit. The chief complaints I have against 99 per cent. of shoes which are otherwise suitable is that the heel part is too loose and that the forepart is too tight.

(3) There must be a bar or strap across the instep.

(4) The heel must not be higher than 1–1½ in. for work and day wear.

That these views are of value is confirmed by the comfort they give to those patients who obtain such shoes. More simply expressed, a good shoe must fit and grip the hind and middle parts of the foot and allow freedom for the toes. There is no other anatomical or physiological problem. It is fashion which decrees the monstrosities of to-day.

As the guardians of the nation's health we are bound to do something about the problem. Medical officers of industrial concerns could at least talk to the employees and explain the evil effects of poor shoes. They might persuade them to wear good (not dear) shoes at work, when appearance is of little importance. The British Medical Association and the British Orthopædic Association are discussing the necessity of publicity and propaganda. Chiropodists and the shoe and leather trade are willing to help. Half of the 2,000,000 crippled feet of Great Britain would be normal to-day if decent shoes were worn. We have to change a fashion. Just as "wasp waists" were abolished when the ill effects were publicised, so could bad shoes be caused to disappear if we set our minds to the task.

Remedial Aspect: Foot Clinics

(WM. BLOOD, M.R.C.S.)

IT is impossible for a worker to give of his best if he has painful feet. This particularly applies if his occupation entails a good deal of standing or walking. Anyone who has experienced the "red-hot feeling" of a painful corn or callus knows only too well that for the time being all the joy of life is missing. It seems likely that during this period of painful feet the efficiency of the worker is reduced. Further, this discomfort may persist for many months before the worker seeks relief, and during this time he is often irritable and low-spirited. The depression induced by painful feet may be a contributory factor in the causation of some of the neuroses.

That a considerable amount of minor foot trouble exists in industry, and that such trouble is bad for both the worker and the employer, has been recognised by enlightened employers during the past few years. In my own firm the problem was tackled by the establishment of four chiropody clinics, which have proved of great value in alleviating pain and discomfort; and by the giving of timely advice on the care of the feet and choice of footwear many deformities have been prevented.

The necessity for these clinics and the workers' appreciation of them are shown by the attendance figures given for the Cadby Hall chiropody clinic. All treatment is given during working hours, and no monetary loss falls on the worker. On the other hand, lest it be felt by some, in view of the fairly large figures quoted, that the worker makes a visit to the chiropodist an excuse for having a rest, it must be stated that he is expected to pay the nominal sum of 6*d*. per foot treated.

TREATMENT AND ATTENDANCE RECORDS OF THE CADBY HALL CHIROPODY CLINIC FOR THE PERIOD SEPT. 1ST, 1937, TO JULY 31ST, 1938

Patients, 444 (men 117, women 327).
Total treatments, 2133, of which 1710 were bilateral.

The foot conditions of which these people complained (not necessarily the only abnormalities present) were :—

Corns and callosities	307	Verrucæ	18
Nail troubles	67	Weak foot or flat-foot	5
Hallux rigidus	11	Hyperidrosis	4
„ valgus	20	Miscellaneous	12

Except in hyperidrosis, pain or discomfort was the presenting symptom. That well-established abnormalities of the feet can exist for a long time without causing much in the way of symptoms is shown by the following observation. Twenty waitresses, chosen at random, and whom so far as it was known had never complained of their feet, were examined. The following were the findings :—

Case	Age	Findings
1	21	Hallux valgus of both feet with early bunions. Corns on each of four outer toes. Arches flat.
2	22	Slight hallux valgus of both feet. Corns on four outer toes of both feet. Second toes hammer.
3	22	Right hallux valgus with severe second hammer-toe.
4	23	Feet slightly flat.
5	24	Osteo-arthritis of left big toe-joint, with slight hallux valgus and bunion.
6	24	Nil. Feet good.
7	24	Wearing corn plaster on each foot.
8	26	Hallux valgus of both feet and bunions—little toes slipping under fourth.
9	26	Some anterior splaying. Bunion on left foot, three corns on right.
10	26	Feet good. One corn only.
11	27	Two corns on each foot; slight hallux valgus.
12	28	One corn on left foot, two on right; slightly flat.
13	28	Slight hallux valgus. Two corns on each foot.
14	29	Hallux valgus of each foot with bunions. Four corns on each foot.
15	31	Feet good. Corns on both little toes.
16	31	Corns on both little toes.
17	32	Corns on both feet—recently treated. Slight hallux valgus—slightly flat.
18	32	Three corns on right foot, two on left.
19	31	Flat (very); corns on right foot.
20	33	Bilateral hallux valgus. Bunions. Flat.

It will be noticed that the feet of five girls only could be considered reasonably free from some abnormality, yet none spontaneously complained of pain, and only four or five admitted to some occasional discomfort. Are we, then, to consider that nowadays corns, callosities, some degree of hallux valgus, and other deformities are normal to the modern working girls feet, or is there some extraneous factor at work?

FOOTWEAR

After examining the feet and footwear of several thousands of women workers, it is impossible to resist the conclusion that most of their foot troubles have been caused by wearing unsuitable footwear. Indeed they know it themselves and often volunteer the information that they used to wear tight shoes, or that they used to wear very high heels. It follows that the wearing of suitable footwear must be popularised. It is generally considered that women's clothing is to-day smarter, more sensible, more hygienic, and more suitable than ever before—with the possible exception of footwear. We are told that young women will not buy suitable shoes, because they are either ugly or not fashionable. If the manufacturers of women's clothing in general have managed to combine cheapness, smartness, and hygiene in their products, why have the footwear manufacturers lagged behind? It would perhaps be opportune and fair to state that footwear manufacturers are beginning to study this question seriously, and that a good deal of work has been done by Mr. H. Bradley, director of research to the British Boot, Shoe, and Allied Trades Research Association, in an endeavour to produce the ideal shoe for the working woman who has a lot of standing or walking to do. That is to say, that although special footwear for sports has long been available, only recently has an attempt been made to produce occupational footwear. It is to be hoped that the next step will be an attempt to make sensible and suitable shoes fashionable and within the means of the working population.

I believe that most working girls begin to damage their feet as soon as they leave school, and that with almost their first earnings they purchase so-called smart shoes in mimicry of their elder sisters.

Enough has been said to demonstrate (*a*) the prevalence of painful feet in industrial workers; (*b*) that it is to the advantage of both employers and employees that facilities for treatment should be arranged; (*c*) that much more attention should be paid to educating the workers to wear suitable footwear, and that such education should be begun before the future worker leaves school; and (*d*) that the footwear manufacturers must play their part.

Industrial Aspect: Shoe Efficiency

(H. BRADLEY, B.Sc., D.I.C.)

IN the British Boot, Shoe, and Allied Trades Research Association we divide our research into shoe production, shoe materials, and shoe efficiency. It is with this last section that this article is concerned.

The term "shoe efficiency" is used in its widest sense, referring to the capability of the shoe to clothe the foot comfortably with good fit, elegantly to be of pleasing appearance, and durably when required for long service. Throughout the ages shoes have been articles of fashion, and we accept this as a stubborn fact and recognise that, whatever may be the ideal shoe on other grounds, if it is condemned because of its appearance it will fail in its ultimate purpose.

There is plenty of evidence that shoes are intimately related to general health; but there is no crystallised knowledge of the subject, and even some of the greatest experts hold widely divergent opinions. For instance, some believe that heels are wholly harmful and that the perfect shoe will not carry any heel at all. On the other hand, others argue that heels are not harmful and, within reasonable limits, may be beneficial. There is small wonder that the public and the shoe industry follow their own inclinations.

MASS PRODUCTION

Our problems are to be viewed from the standpoint of a mass-producing industry. One of the principal objects in the design of shoes to be produced in bulk is that in their gradations of sizes and breadths they should be capable of fitting as many feet as possible. When the first model has been constructed the next step in bulk-production is to make larger and smaller, broader and narrower lasts from the model. The dimensional gradations imposed upon the model must be as accurate as possible, conformable with the corresponding gradations in feet.

We have analysed statistically many thousands of foot measurements and on this analysis have based a system of gradation of lasts which has a high degree of conformity with feet. This is an exceedingly important advance, but it is a type of progress which is not conspicuous and not immediately evident to the public. Its effects occur tacitly, by improving the ease with which the ordinary person in the street can get suitable shoes.

DISTRIBUTION

It must also be remembered that however perfectly the manufacturers can produce well-fitting shoes, the industry still depends on the machinery of distribution, and there are many obstacles along the road between the production of the perfect shoe at the factory and its finding the right foot to wear it. To-day there is a definite hiatus between production and consumption not adequately bridged, and thousands of shoes are sold to the public without any real attempt to fit them. In the rush trade on Friday and Saturday, so common in many areas, the customers are left to take just what they like, and often they take shoes, whether they fit or not, if they happen to be the style or to have the appearance of what they are seeking just at that moment. So, while imagining our ideals and working towards them, we must never lose sight of the practical politics of the question and the large amount of educational work that will be necessary among the general public if the benefits of real advances in shoe-making are to be realised by the public.

NEW DEVICES IN RESEARCH WORK

In the development of research various new devices have been constructed. One, for example, is a foot-measuring instrument which does more than any instrument previously invented in measuring the shape and type of foot. This instrument makes certain angular measurements in place of the customary linear measures, and certainly it succeeds in recording an indication of the shape of the foot in regard to several of its important features.

We have also made a new instrument for taking the foot impression. This is an electrical device making impression only during the time that the electrical switch is on. In other words, the process is absolutely under control, and this has several advantages over the older methods with inks and dyes.

Again, a gait-recording device shows how the sole of the foot or shoe makes contact with the ground in walking. This permits a study of the influences of different shoes upon the gait of a person and the differences between different persons thus throwing light on deep-rooted questions in the design of lasts and shoes.

In another series of experiments we have been making observations on the effects of different shoes and various heel-heights on poise and the movement of the centre of gravity of the body. Our results show that investigators who in the past have pronounced definite conclusions in precise terms have made their decisions on inadequate data, for we find considerable variation between individuals and their reactions to heel-height. Our records also suggest that a person's reaction may depend on a variety of factors, including, for example, her customary employment.

OCCUPATIONAL FOOTWEAR

The foregoing few brief references must suffice to show that a good deal of spade-work has been done in preparing the ground for shoe-efficiency researches, and now the time has arrived to integrate some of this preliminary knowledge into further experiments, and for some time it was a puzzle to know how to organise the type of investigation that seemed desirable. Then occurred the idea of "occupational footwear," which opens up large possibilities. People spend most of their time at their work, and many employments involve long hours on the feet. Therefore, if shoes are as important in relation to health as we believe them to be, it is probable that the kind of footwear worn at work is considerably more important than what is worn in leisure hours.

The conception is that appropriate shoes can be designed for a wide variety of industrial employments, and that, if the workers can be induced to wear these suitable shoes, there will be in the aggregate much benefit. According to the plan in view there should be shoes suitable for waitresses and such people whose work involves a good deal of walking about indoors; shop assistants and machine minders, who have to stand a good deal but perhaps do not walk very much; policemen, bus and tram conductors, railway workers, and so on. There ought to be appropriate footwear for these and all other employments, and in some instances the shoes might conceivably have very distinctive characteristics appropriate to the needs of the case.

But to develop these various kinds of shoes properly by the necessary research methods requires the coöperation of the medical profession, especially the industrial medical officers. We have begun this work, and our gratitude must be expressed to the firms coöperating. We have prepared a last for waitresses. Here it is necessary to interpolate a reminder that there is a great practical difference between designing a last for feet as they are and designing a last for what we should consider to be the ideal or perfect foot. There are very few perfect feet to-day, and, if we were to make the perfect last, there would be very few feet able to wear shoes from it. This is always a practical problem which the shoes industry has to face. A shoe manufacturer would not remain in business long if he were to limit his output to what might be considered the perfect shape of shoe.

These thoughts bring us back to the question of education of the public. As they are educated to take greater care of their feet, the general type and form of feet will improve, and the shoe industry will gradually adjust its lasts accordingly. Through "occupational shoes" and the coöperation of welfare organisations the possibilities open up of large-scale educational work, and, as suitable shoes are designed and recommended, the more it will be impressed upon large sections of the community that better shoes are better for them. Thus, the man and woman in the street will realise more and more forcibly that the present carelessness about feet is a serious error.

FOOTWEAR MATERIALS

The last is of fundamental importance, for it determines the shape and fitting of the shoe, but from a hygienic standpoint the nature of the components built into the shoe is of almost equal importance. There is a very wide variety of alternative materials available to the shoe manufacturer's choice to-day, ranging from high-quality to low-quality leathers, from high-quality to low-quality synthetic materials, and these cover all varieties of properties, such as porosity and permeability, waterproofness and absorptivity, which means that very careful selection must be exercised in the manufacturing specification of our occupational footwear.

There are also several alternative methods of constructing a shoe, by which is meant principally the method of uniting the upper to the bottom. Welted construction, McKay sewn, the cemented, and others have their own peculiar properties and qualities of flexibility or rigidity, durability, and watertightness. So here again careful consideration is needed before deciding which kind of construction shall be selected for any particular purpose.

Summing up, there can be no doubt about the subject's large importance. By research and investigation footwear can be designed and constructed to be peculiarly suitable for various industrial employments. If the scheme has the encouragement and support of those interested in industrial welfare, especially the industrial medical officers, there can be no doubt of its having ultimately far-reaching reactions in general well-being.

MEDICO-LEGAL SOCIETY

LORD DAWSON ON ILLEGAL OPERATIONS

AT the annual dinner of this society, held at the Connaught Rooms, London, on Dec. 16th, with Mr. Justice HUMPHREYS, the president, in the chair, Sir ROBERT PICKARD, vice-chancellor of the University of London, proposed Medicine and Law, and spoke of the reliance increasingly placed by medical men on the advances of the chemist.

Lord DAWSON said that the common law reflected in no common way the genius of the British people. It concerned itself primarily with remedies for specific needs and wrongs, and was influenced by precedent but very little by principle. It had been built up by a happy synthesis of individual judgments, from which rules and principles had from time to time crystallised out. The common law was therefore dynamic, and sensitive to prevalent standards of conduct and to the progress of knowledge. A striking example of this quality had been seen in pronouncements on the law of abortion during the last seventy years. They had walked step by step with medicine but always a little behind, as they should. The latest of these interpretations had, from the doctor's point of view, been epoch-making, for it had marked the first occasion on which health had been correlated with quality as distinct from quantity of life. During recent decades there had grown up in the public mind a greater regard for quality of life, and there was not such a desperate regard for mere quantity. The recent judgment had stressed quality, and had suggested that there was no very great difference between good health and life.

This spirit of the common law was congenial to the spirit of medicine in recognising the individuality of man, with its infinite variety of circumstance and contingency. One result of an increasing regard for the quality of life, whether the life already existed or lay in the future, was a conflict between medicine and the ancient law of maim—unlawful wounding and bodily harm. A man and a woman of mature age wished to marry but each of them was liable to transmit disease. Nothing would induce them to produce children, and they therefore asked that one of them might be sterilised. What objection could there be to giving them this freedom of choice? Nevertheless, a friend of Lord Dawson's who was a distinguished judge had warned him that if he complied with this request he would be endangering his attitude towards the law and might come under its strictures. Again, a woman never suffered from hæmophilia but might carry it and transmit it to her male children. Such a woman, wishing to marry, might ask to be sterilised. Lord Dawson could see no ethical reason why her request should not be granted with proper regard to the quality of life and of health as distinct from quantity. No one would be under compulsion, and conscientious objectors to the idea were not asked to violate their principles, but merely to allow the freedom to others which they received themselves. A more theoretical example was that of a man who carried typhoid in his gall-bladder and was willing to have that organ removed for the protection of the community; there was a possibility that the operation would be illegal. Such shackles might have belonged to other days, but should now be removed, so that medicine might be set free to widen its range in the endeavour to create a healthier race. The society might appropriately set up a committee to investigate how, with reasonable precautions, these laggard provisions of law might be brought up to date and attuned to modern knowledge and the public conscience.

Mr. Justice MACNAGHTEN, also replying to the toast, said that both he and the president were servants of the common law and would resent the suggestion that it changed with popular emotion. On the contrary, it was founded on the common sense of the people of the country and was unchangeable except by Parliament, in its wisdom or otherwise. Much of the criminal law of England had been founded on the Ten Commandments—or such of them as were applicable—and one of them was "Thou shall not kill." The law against killing applied also to the unborn child, but when the choice had come to be made between the life of the unborn child and the life of the living woman, the common law, differing from the canon law, had preferred the life of the mother. There had originally been great difficulty in proving, according to the ideas of older times, that the unborn child had been alive at the time of the miscarriage, and Parliament had enacted in the reign of George III a law declaring that miscarriage was a crime even if the woman was not pregnant. A popular superstition had therefore arisen that in all circumstances it was illegal to procure a miscarriage. The common law had, however, remained the same: it was always lawful to kill the unborn child if to do so were necessary for preserving the life of the mother. To preserve her life did not mean to preserve her as a lunatic or as an absolute physical wreck—to preserve, in fact, what was not really to be called life at all. This was the law which he had expounded to the jury. Some who did not know—in which class he included Lord Dawson!—thought that the common law had changed. On the contrary, it had always been the same, and those who trusted it would be safe.

Mr. ST. JOHN MICKLETHWAIT, K.C., spoke of the great revolution in the treatment of the criminal that had taken place in the last hundred years and had culminated in the provisions of the Criminal Justice Bill, which showed the extent to which medical thought had influenced law and practice.

The PRESIDENT, in reply, dealt with the affairs of the society and pointed to a sound financial position, a membership of 400, a live quarterly journal, and monthly discussions covering a very wide range of subjects. Judge T. B. LEIGH, president of the Manchester Medico-Legal Society, proposed The Guests, and Prof. W. S. ROBERTS and Miss ELIZABETH BOLTON replied.

GRAINS AND SCRUPLES

Under this heading appear week by week the unfettered thoughts of doctors in various occupations. Each contributor is responsible for the section for a month; his name can be seen later in the half-yearly index

FROM AN ANATOMIST

IV

IT may be that on reflection there will be some who are willing to absolve me from impertinence when I regard the physical make-up of man as being that of a singularly immature and undeveloped mammal. For in this business I am sinning in good company. Prof. Bolk of Amsterdam enunciated the thesis of fœtalisation to account for the distinctly human characteristics of man's anatomy. Sir Arthur Keith, in many publications, has woven the thesis into his accounts of human origins and probably most anatomists would agree that there is about the bodily organisation of man, as a species, an extraordinary underlying element of immaturity. The time has passed when the delight of the reader could be ensured by the lauding of the perfections of the human body, and I am glad that it is so. We no longer look to excite admiration by alluding to the upright gait, the lofty appearance, or the god-like attributes of the human body. We have come to realise that, whereas a former generation found comfort in the belief that God made man in his own image, there are those among us who would rather declare that man made God as a grandiose representation of his own specific type.

> In his image God made me
> He made the fly, he made the flea.
> I often wonder if the flea
> Says: "In his image God made me."

I fancy that to-day we have abandoned the theory that man's body was created in imitation of that of the Deity. If this is so, are we prepared to go one stage further and to admit that man, as a zoological type, is a peculiarly low-class mammal, when mammalian specialisations and perfections, as we know them, are considered as the acme of mammalian development? For my own part I can see no sort of escape from such a conclusion.

* * *

It was the publication of Darwin's theory of evolution that first produced that great reaction in thought that made a reconsideration of our position in the zoological scale imperative. It is difficult to-day to picture the upheaval of ideas that followed in the immediate post-Darwinian years. Should concessions be made to the new ideas and should it be admitted that in truth there seemed to be some very lowly things incorporated in the anatomical form which, according to current belief, both scientific and popular, was most akin to that of the Supreme Being himself? When the crisis came there were those of the old school who stood their ground. Richard Owen fought a manful rearguard action in defence of man's bodily distinctions. One by one, his trenches were captured by the young men of the newer school: and in the end it seemed that the old guard could only fall back on the last trench and admit that though man's body might betray a lowly heritage, his mind, his intellect, his supreme human gift of a soul severed him utterly from the rest of the animal kingdom. It is rather remarkable that once the divine kinship of human bodily architecture had been abandoned, the advocates of the new ideas turned to rend human anatomy and to show that it was in reality the most disharmonious jumble of misfits and incongruities that must inevitably lead to its own undoing or to resort to a competent surgeon. And indeed, the fortunes of surgery benefited considerably from the revolt against our bodily organisation that was so ably led by Metchnikoff and his followers. It would have been far better for patients, if not for surgeons, if Bolk's theory of infantilism, rather than Metchnikoff's theory of disharmonies, had prevailed forty years ago. For if this had been so, many more people would have died comfortably possessed of various organs which, though perhaps not fully perfected in mammalian specialisations, were, after all, very useful to their owners.

But despite the decrying of our physical imperfections, which was the key-note of Metchnikoff's work and of those who set a fashion in surgery which lasted for some time, there was always the reservation, which was an inhibition even to Descartes in the formation of his theories, that the human mind was something outside all this. The appendix might be a snare, a misfit, a deadly inheritance that we could not avoid, since it was thrust upon us by reason of our lowly ancestry. It was easy and remunerative to remove the appendix, but there the business must stop: the human mind, the intellect and all that it implied, must still remain where it was enthroned in pre-evolutionary days, as something altogether apart. Man might be primitive, or even infantile when regarded as a physical thing: but there was nothing primitive or infantile about his mind.

Owen lost his last physical trench when Huxley tore to shreds his assertions concerning the posterior cornu of the lateral ventricle of the brain. Kingsley in "The Water Babies" recorded the last battle waged over the hippocampus. But though Owen's last trench of human cerebral distinctions was lost, there still remained the peculiar human psychic distinctions that could not be revealed by scalpel and forceps. Surely there is nothing infantile or immature about that supreme human attainment? The intellectual life of man is on a plane so far removed from anything we know of in other mammals that surely we must regard it as something almost apart from the general application of evolutionary laws? And so we dreamed, not actively defending, but complacently realising, our last stronghold against the newer ideas. We

dreamed until we were awakened by the newer psychologists.

* * *

Perhaps it was James Harvey Robinson who first awakened the general run of mankind to a realisation of the hopeless bondage in which the human mind was held by reason of its lowly origin. In the "Mind in the Making" he presented us with, what he himself terms, a "general show-up" of human mental processes. For many of us it was probably rather a show down than a show up, for he made very real the truth that but little could be expected from an equipment so recent and so experimental as is the basis of human mentality. "In all our reveries and speculations, even the most exacting, sophisticated and disillusioned, we have three unsympathetic companions, sticking closer than a brother and looking on with jealous impatience—our wild apish progenitor, a playful or peevish baby, and a savage." How, Robinson asked, could man be expected to think always in accord with the demands of modern civilisation when, in his whole ancestry, civilisation counted only for a second or so against the days spent as savage man, the months spent as a baby, and the years as a mere mammal. Always the brute, the baby, and the savage were at his elbow; all had more place in his mind than that very recent veneer laid on by his short apprenticeship to civilisation. What Robinson brought home so vividly from the evolutionary and historical point of view, the newer psychology has made abundantly clear from the aspect of mental pathology. The brute, the baby, and the savage, whose ancestral claims permit them so large a part in all our thought processes, were treated very openly by the author of the "Mind in the Making." For him, they were all incorporated in our general cerebral make-up, just as similar atavisms are incorporated in other parts of our body: he did not try to smuggle them away into some obscure corner from which they could only be dug out again on special occasions. And there he differs, so far as I can see, from the new psychologists, for they would have us believe that these things are tucked away in some strange receptacle known as the unconscious mind.

* * *

I have never felt quite certain if the thoroughgoing psycho-analyst or analytical psychologist has any very definite idea as to what and where this unconscious mind is. Indeed, I have sometimes wondered if he were not in much the same dilemma as was Descartes who, having no anatomical home for the human soul, relegated it to the pineal body. I have even pondered as to what he would do if he were given a human brain and asked to demonstrate, with scalpel and forceps, the site of this curious thing. Perhaps that is asking too much, for when we deal with those who make great study of the mind, we should avoid all attempts at discussing so material a thing as the brain. But if we may not ask them to be very exact as to where the unconscious mind is situated, we have a right to expect them to tell us just what it is. Jung has produced much discussion concerning the processes of thinking and their influences upon our psychic reactions; but I have never found a very clear-cut statement as to why we all are dominated, consciously or unconsciously, by the infantile in our mentality. Yet I believe the explanation is a very simple one. Max Muller argued at great length that all processes of thinking, and all that we call mind, depended upon the use of language as symbols for our ideas. For him, all thought was verbalised thought, and certainly the more you think about thought, the more assuredly can you convince yourself that your thinking is done only in terms of words. It requires no great imagination to picture the effect of such a dogmatic assertion on the author of "Erewhon," and Samuel Butler soon demolished the argument by instancing his friend, the deaf-and-dumb Sicilian waiter, who could neither read nor write and yet most certainly could think without a knowledge of words. And that, of course, we all know; and we know that there is such a thing—and a very elaborate thing—as completely unverbalised thinking. This is the thinking of the brute and of the baby: but we, when we learned a language, supplanted it by verbalised thought. In all our waking hours we think in words. Words have dominated our waking thoughts: but they have not succeeded in dominating the whole of what we call our mind. The unverbalised thinking of the brute and the baby is always liable to intrude itself in moments when we least expect it. We must all agree that in those early years of childhood, when new impressions are forcing themselves into recognition in a perpetual stream, the child does a deal of thinking. But before it has learned a language, its thinking must of necessity be unverbalised, and somewhat on the same plane as the thinking of an intelligent animal: nevertheless, it is real thinking and it leads to real experience and to real memory. "The burnt child dreads the fire."

* * *

Now just as we adults have subjugated our unverbalised thoughts by thinking only in forms of words, so we have come to rely almost entirely on words as our source of memory. If we have once thought a verbalised thought we can possibly evoke it again as a verbalised memory; but most of us have lost the knack of recalling our vast store of unverbalised memories at will. Yet they are liable to colour or distort our psychic processes. They are always with us, though, as the psychologist would say, they are not always at the level of consciousness. They are always with us though even after deliberate efforts to recall them they refuse to recur as memories. Of all the myriad unverbalised thoughts that come to the child before it has learned the use of language, not one can be consciously evoked as a memory by most of us. But they come subconsciously: that is their revenge. Thoughts that belong to our ancestral animal heritage, thoughts that belong to our babyhood, our infancy, our heritage of primitive man, all these are stored away in our memories. We cannot call them to the surface and examine them with the cool judgment of our subsequently acquired verbalised mentality. But they are there—and when they are dragged out into the light of day by the rituals of the psycho-analyst they are, as the Devil is reputed to have said when he first saw the Ten Commandments, a rum-looking lot. I would suggest that the aims of the psycho-analyst are directed mainly to the re-evoking of unverbalised memories laid down in the period of infancy: and that the unconscious mind is unconscious only to the extent that its contents are unverbalised. The psycho-analyst has at least destroyed our conceit in ourselves so far as our psychic processes are concerned, and I have a doubt if, despite the occasional occurrence of a few rare souls in the history of human life, our minds are much more grown up or dignified than our bodies. We are permitted to hide the infantile defects of our bodies beneath the garments of civilisation: but the infantile defects of our minds we can conceal, when we are fully conscious, from our fellows by a host of ingenious subterfuges.

CORRESPONDENCE

CONTROL OF SMALL-POX

To the Editor of THE LANCET

SIR,—I have read with great interest in your Control of the Common Fevers series Dr. J. J. Butterworth's excellent review of small-pox. But I regret that he did not comment on the present unsatisfactory system of vaccination which, whilst costly and worrying, is useless in the control of spread and throws discredit on other forms of immunisation, for instance against diphtheria. Even if Dr. Butterworth could have universal vaccination repeated in every member of the population at suitable intervals would he think it worth while, seeing that at least variola major is easily controlled by the administrative methods he describes, combined with vaccination of staff and contacts. If we were also given power to control the movements of tramp contacts and to keep in better touch with immigrants from infectious ships our means of stopping the spread of the disease would be complete.

In the search for overlooked cases Dr. Butterworth does not mention the presence of "seeds" in the soles of the feet. These desiccated unbroken pustules appear as flattened dark brown discs which remain for long periods under the hard and thickened epidermis of the soles of the feet. As they indicate with certainty a recent attack of small-pox they often clinch the diagnosis of the nature of recent illnesses in contacts.

I am, Sir, yours faithfully,

DUNCAN FORBES,
Dec. 17th. Medical Officer of Health, Brighton.

ADAPTING THE LIMB TO THE STUMP

To the Editor of THE LANCET

SIR,—Mr. Desoutter's letter in your last issue serves to emphasise the necessity of greater coöperation between surgeons and limb-fitters, such as exists at Queen Mary's (Roehampton) Hospital. Amputations may become necessary under two different conditions:—

(*a*) Where the surgeon is compelled by the degree of injury or by the condition of the skin to amputate at a level which, in his opinion, will eventually lead to the most satisfactory limb, and to use flaps which are not ideal. Here the limb-fitter is asked to help by devising the best prosthesis he can.

(*b*) Where the surgeon has a free choice, as for instance where the foot is destroyed and the leg intact, or in the case of trophic lesions of the foot in unrecovered injuries of the sciatic nerve. Here the surgeon should operate in such manner as to make the task of the limb-fitter as easy as possible.

Mr. Desoutter is perfectly right in saying that amputations often leave too long a stump and that this is inadvisable, not only as interfering with the mechanism of the artificial limb but also leading to ill-nourished stumps. For this reason there has been during the last five years a tendency in planned amputations to make shorter stumps. For example, whereas we used to choose a 7-in. tibia for a below-knee amputation we now prefer a 5½-in. one; in above-knee amputations we are not content with merely giving sufficient clearance for the knee-joint, we find that a 10- to 11-in. stump, measured from the great trochanter, is the ideal.

Again, many of the amputations described in the older text-books are obsolete, and others nearly so. Even the Syme is really only suited to bare-footed natives, who will never wear an artificial limb, and can run about after a Syme's amputation with surprising ease. Amongst civilised races this amputation, however well done, rarely stands the test of time, and becomes unsatisfactory from such causes as displacement of the flap and rarefaction of the bone. Flaps are often ill-planned and too long. Their circulation is thus unsatisfactory, and a loose bag of tissue is left to accumulate serum as a culture medium for sepsis. The length of the flaps must be governed by the circumstances necessitating amputation. It would be courting disaster to use flaps of the same length in a case of arterial disease and in one of injury to a healthy limb.

Finally, the situation of the nerve-ends should be carefully planned. It is by no means always advisable to cut the nerves as short as possible, as we once did, since by doing so we may well place the ends in a position where they are pressed upon by the bucket of the artificial limb, whereas they remain unhurt at the end of the stump.

All good artificial-limb makers realise these points, and it can do nothing but good if they exchange views with the surgeons for whom they work.

I am, Sir, yours faithfully,

Harley-street, W., Dec. 18th. P. JENNER VERRALL.

FACTORS IN NEONATAL MORTALITY

To the Editor of THE LANCET

SIR,—With reference to your annotation of Oct. 29th (p. 1009) commenting on the work of Yerushalmy, it may be of interest to publish the accompanying Table relating to the incidence of stillbirths in some

PERCENTAGE OF STILLBIRTHS AMONG WHITE WOMEN OF THE U.S.A., 1932

Order of births	Under 15	15–19	20–24	25–29	30–34	35–39	40–44	45+	Total all ages
1st ..	5·3	3·1	2·8	3·0	4·2	5·9	8·2	8·6	3·2
2nd ..	..	2·2	1·5	1·7	2·0	2·9	4·8	6·9	1·9
3rd ..	..	3·0	2·0	1·9	2·2	3·1	4·2	6·0	2·2
4th ..	..	5·9	2·1	2·0	2·5	3·3	4·5	5·7	2·5
5th ..	..	9·1	3·0	2·1	2·6	3·5	5·1	6·1	2·8
6th ..	..	..	4·5	2·7−	2·7+	3·6	4·7	5·9	3·2
7th ..	..	..	5·2	3·6	2·8	3·4	4·5	9·2	3·4
8th ..	..	..	5·1	4·3	2·9	3·4	5·1	5·8	3·7
9th ..	..	..	6·3	5·3	3·6−	3·7	4·8	5·1	4·1
10th and over ..	..	..	2·2	4·8	4·9	4·7	5·4	6·9	5·1
Total all orders	5·3	3·0	2·3+	2·3+	2·8	3·7	5·1	6·9	2·8

1,729,800 births among white women of the United States of America. I have calculated the rates from statistics which appeared in the 1932 Census volume of the U.S.A. Department of Commerce, and it seems to me that the following conclusions can be drawn:—

1. In all the age-groups the risk of a stillbirth is greater at the first birth than at the second.

2. At first, for each order of birth, the chance of a stillbirth decreases with age, but afterwards it steadily increases; the age at which the risk again attains the risk at the youngest age for that order increases with the order. On the average the least risk of stillbirth (all orders) is 2·3 per cent. in the age-group 20–29. This is less than half the risk at the lower and upper limits of the child-bearing period.

3. In all the age-groups the stillbirth risk at first decreases as the order of birth increases and then steadily increases; the order at which this risk again becomes equal to the risk at the first birth increases

with age. The average chance of a stillbirth (all ages) is 3·2 per cent. for first-borns, which is again reached at the sixth birth.

4. Considering each age-group as a generation of mothers, and assuming for example one birth in each age-group per generation, the rates taken diagonally downwards from left to right can be taken to represent the resulting risk of stillbirth to women of a given generation at successive confinements throughout the child-bearing period. It is seen that the risk decreases at first with increase in birth order and then steadily increases; also that the birth order at which the risk again equals the risk at the first birth decreases with increase in the age at first confinement. For example, the risk 2·8 per cent. at first birth for the age-group 20–24 is exceeded again for that generation somewhere between ages 35–39 at the fourth confinement; that of 4·2 per cent. for the first birth in age-group 30–34 is attained again for that group in the third confinement at ages 40–44.

It also appears that the minimum risk of stillbirth at each confinement is obtained by spacing the confinements over the child-bearing period as follows: first and second births at ages 20–24; third, fourth, fifth, and sixth at ages 25–29; seventh, eighth, and ninth at ages 30–34; and tenth and over at ages 35–39. I am, Sir, yours faithfully,

C. A. GOULD.

Madeira-avenue, Bromley, Kent, Dec. 8th.

THE "IRON LUNG"

To the Editor of THE LANCET

SIR,—The "iron lungs" which Lord Nuffield is manufacturing and presenting to hospitals are made in accordance with the original design of Prof. Drinker of Harvard University, but of wood instead of steel. Drinker himself had made a respirator of wood, but found steel to be better. In many press notices of Lord Nuffield's gift the inventor appears to have been forgotten. It was the high incidence of infantile paralysis in the U.S.A. which led Prof. Drinker, after much experimental work, to invent his respirator, and a large number of these are in use in American Hospitals. In 1930 Drinker brought an "iron lung" (as the press called it) to England and demonstrated its use to the profession. Sir Robert Davis purchased this particular apparatus and made arrangements with Prof. Drinker for its manufacture. In accordance with medical custom no patent was taken out, but the apparatus was to be known as the Drinker respirator. The original machine was freely lent to several hospitals, and was the means of saving several lives, a notable case being that of the Stowe schoolboy, who recovered after treatment in this machine for many weeks at the Wingfield-Morris Orthopædic Hospital. A cheaper model, of simplified construction, was, I understand, made and supplied to the London County Council in 1934 at the price of £97. Subsequently, as the result of practical experience of L.C.C. medical officers, refinements and accessories were embodied, with increase in cost, but making for greater efficiency in operation, and greater comfort of the patient. Lord Nuffield's model is similar to the simplified machine produced in 1930, but all the models are on Drinker's principle, and in justice to him should be referred to as Drinker respirators. While public welfare is paramount, and everyone appreciates the generosity of Lord Nuffield, credit is due and should be given to those who have made and perfected these respirators. Dr. Crowden, writing in your last issue, doubts whether a wooden structure will ensure the safety of the machines to meet emergencies which very rarely occur.

Another type of respirator in which rhythmic compression of the chest is used, invented by Sir William Bragg to meet the needs of a paralysed friend, has been perfected by Mr. R. W. Paul. It was first described in THE LANCET in 1934 (vol. 1, p. 786). I am, Sir, yours faithfully,

LEONARD HILL.

Chalfont St. Peter, Bucks, Dec. 18th.

THE REFUGEES

To the Editor of THE LANCET

SIR,—Refugees will be coming to this country and many are here. Some of these are members of our profession. We are glad to give them sanctuary, but it is cruelty to allow them only to live here.

In those cases of which I have knowledge the permit stipulates that they shall not take a qualifying examination and it forbids them to practise. Therefore they have to live on charity. It is unfortunately true that recent experience would make us beware of admitting exiles into our profession, for there are among those already here men who are of poor quality professionally and with ideas of behaviour that can only be called dishonourable. But among the more recent arrivals are men of good repute and high standing, and well known in the profession. Some of them are well on in years and for them their work is their life. We shall not be giving them real hospitality unless we make it possible for these men to work, and I hope that the Home Office, backed by our profession, will withdraw their restricting regulations, of course with proper safeguards.

Personally I feel that our hospitality is of little value if we forbid these men to work, and I hope that those who have to decide such matters will show generosity of mind and action.

I am, Sir, yours faithfully,

Portland-place, W., Dec. 15th. CHARLES MILLER.

SULPHANILAMIDE AND SPERMATOZOA

To the Editor of THE LANCET

SIR,—Under the heading "chemotherapy of gonorrhœa" in your last issue Dr. Marshall refers to the findings of Jaubert and Motz, as quoted by Dr. Jules Janet, that after taking sulphanilamide 30 per cent. of patients had low spermatozoon counts verging on a state of azoospermia. He asks whether any investigations have been made on these lines in this country.

In March of this year Dr. Janet informed me, in a personal communication, of the then unpublished findings of Jaubert and Motz. Since then I have examined the semen of 70 patients, at hospital and in my practice, following sulphanilamide therapy. Only one patient was suffering from azoospermia and this was known to have been present before sulphanilamide was given. A few weeks ago I informed Dr. Janet of these results and he agreed that his experience had shown the condition to be transitory. In my cases all the tests were carried out at least two months after cure had been established and my failure to confirm the work of Jaubert and Motz may be due to this time-interval.

Palazzoli, Nitti, Bovet, and Levinson (*C.R. Soc. Biol. Paris*, May 21st, 1938, p. 261) have performed animal experiments which fail to indicate that sulphanilamide affects spermatogenesis. Doses which by weight were equivalent to 30 g. a day in the human subject were administered to 10 rabbits for

one week. Before administration was begun one testicle was excised and six days after completion of the course the other testicle was removed. Three of the rabbits were placed with females before the second excisions. In each case normal motile spermatozoa were found in the vaginæ of the females and in two cases pregnancy resulted and normal litters were produced. Examination of the excised testicles and those of 4 controls convinced these workers that large doses of sulphanilamide administered over a period of one week had no influence on spermatogenesis in the rabbit.

I am, Sir, yours faithfully,

Wimpole-street, W., Dec. 19th. A. H. HARKNESS.

To the Editor of THE LANCET

SIR,—Dr. Marshall asks whether any investigation has been made in this country on the effects of sulphanilamide on fertility. Some months ago we instituted experiments on mice in order to clarify this important question. The animals received Prontosil by injection and were killed at various intervals after the last injection. Examination was concerned with the histology of the testis, the size of the seminal vesicles, and the effect upon the spleen. We can already state that even a few doses of prontosil may disorganise the germinal epithelium without affecting the interstitial function at the dosage levels in question. It is, however, not yet possible to state the minimum dose required to produce adverse changes in the testis, nor have we any information yet relating to the period during which the changes will persist after injections have ceased. A fuller report will be issued in due course.

We are, Sir, yours faithfully,

KENNETH WALKER,
C. WELZLER SIGETI,
B. P. WIESNER.

London, Dec. 19th.

TREATMENT OF RHEUMATOID ARTHRITIS WITH A NEW GOLD SALT

To the Editor of THE LANCET

SIR,—In last week's article by Prof. Hartfall and Drs. Garland and Goldie it is pointed out that Parmanil is one of the least toxic of gold salts, yet I see in Table VI that in 69 courses parmanil gave 4 severe reactions (roughly 6 per cent.); on the other hand in the case of Solganal in 301 courses there have been only 5 severe reactions (i.e., 2 per cent.). When treating severe arthritis with gold one must often disregard slight and moderate reactions, but I cannot see that parmanil is less toxic than solganal when the ratio of severe reactions is 6 per cent. to 2 per cent. as shown in Table VI. In an article published at the end of 1937 Prof. Hartfall and Drs. Garland and Goldie gave an interesting survey of many gold preparations and I noted at the time that no fatality was reported with solganal, against quite a few with other preparations. My personal experience of gold salts has been more or less limited to solganal, which I invariably give intravenously. I have never had a fatality although I have used it constantly since 1932, and the only severe toxic reaction I have seen is troublesome dermatitis which fortunately is rare. I should therefore hesitate to change to parmanil while the percentage of severe reactions is still as high as with Myocrisin and Crisalbine.

I am, Sir, yours faithfully,

VERNON HETHERINGTON.

Weymouth-street, W., Dec. 19th.

RADIOLOGY AND OBSTETRICS

To the Editor of THE LANCET

SIR,—I am afraid that I remain unconvinced by Mr. Bourne's reply to my letter of Dec. 3rd. He allows that "here and there . . . it is of great assistance to have the exact evidence of the radiologist." How is this to be obtained in the absence of regular practice?

The importance of clinical training is undeniable, but I cannot think that the student would suffer by having his findings checked radiologically. Special methods of diagnosis should be kept in their proper place as accessories, but few would be willing to go back fifty years because of the high standards to which *some* clinicians attained.

After sixteen years of midwifery in general practice, I have been forced to the conclusion that the system of the conduct of midwifery by general practitioners is unsatisfactory. At the rate of 100 cases a year, which in these days is rarely reached, I found that abnormalities occurred so infrequently that it was difficult to recognise them with that degree of certainty which gives the confidence necessary to leave well alone. A knowledge of statistics gives but cold comfort in the individual case. It is my belief that we are moving rapidly towards the time when antenatal work will be conducted by whole-time specialists, and labour by trained midwives, with these specialists on call. In that day radiology will serve its proper function of clearing up all cases of doubt as to disproportion and post-maturity; but in the meantime I suggest that every advance of this kind is to be encouraged that perfecting of technique may be secured.

I am, Sir, yours faithfully,

Bexhill-on-Sea, Dec. 17th. NORMAN REECE.

TREATMENT OF TRIGEMINAL NEURALGIA

To the Editor of THE LANCET

SIR,—Rather than inject, I prefer to pass a slender insulated electrode along the hollow needle, and apply a weak coagulating current from a diathermy apparatus for a few seconds.

I am, Sir, yours faithfully,

Halifax, Dec. 15th. W. O. LODGE.

MUCO-MEMBRANOUS COLITIS TREATED BY PELVIC SYMPATHECTOMY

To the Editor of THE LANCET

SIR,—Muco-membranous colitis is a common condition which usually resists treatment. It has long been known to be related to nerve dysfunction. In a case lately operated upon by me the patient had both dysmenorrhœa and muco-membranous colitis. The mucous membrane of the colon was periodically shed and passed as a cylindrical cast by the rectum. For the relief of severe dysmenorrhœa I sometimes perform pelvic sympathectomy, and it occurred to me that since colitis is related to nerve trouble, sympathectomy might improve both the disorders from which my patient was suffering. I resected the sympathetic hypogastric nerves, which are sometimes known as the presacral nerves, after the technique followed by Gaston Cotte of Lyons. After the operation the dysmenorrhœa was relieved as was expected, and the muco-membranous colitis was also cured. The woman was operated upon four months ago and since then the colon trouble has not returned.

As no mention has been made of sympathectomy as a means of treatment for muco-membranous

colitis, I thought it should be brought before the profession for consideration.

I am, Sir, yours faithfully,

FAKHERDDIN EL-AHMADI,
Gynæcologist to the Government Hospital.
Dec. 5th. Tanta, Egypt.

A CORRECTION

To the Editor of THE LANCET

SIR,—In your obituary notice of last week on the late Dr. John Sinclair, you say that he preceded me as chief medical officer to the Post Office. This is true but might give a wrong impression. From 1920, when Dr. Sinclair retired, to 1933 the chief medical officer of the Post Office was Colonel H. V. Prynne, C.B.E., D.S.O., F.R.C.S.

I am, Sir, yours faithfully,

London, E.C., Dec. 17th. H. H. BASHFORD.

MEDICINE AND THE LAW

Damages for Nervous Shock

MENTAL or nervous shock, said the Court of Appeal last week, is just as really damage to the sufferer as a broken limb. If it be caused by a defendant's negligent act, the plaintiff has a right to recover damages. Mental or nervous shock may be less obvious to the layman than a broken limb; "but nowadays it is equally ascertainable by the physician."

The occasion of these observations was the remarkable case of Owens *v.* Liverpool Corporation. The negligent driver of one of Liverpool's tram-cars collided with a hearse. The hearse was damaged and the coffin displaced. The family mourners were not physically injured, but they sued the corporation for the distress and shock which the incident had caused them. The Court of Passage, an ancient court with ample jurisdiction in local matters, dismissed the claim. The judge was satisfied of the tram-driver's negligence, and found also that the aged mother and other relatives of the deceased had received injury from the sight of damage to the hearse containing the coffin and body of a near relative. He assessed the damage suffered by the various members of the funeral party—so much for the mother, so much for an uncle, so much for a cousin, and a cousin's husband. But the judge felt himself obliged to hold that damages could not be recovered unless there was apprehension (or actual sight) of injury to a living person. Damage to a coffin or a corpse was not enough.

The plaintiffs appealed on the ground that shock was as much an injury as a physical blow; the damage in this case was unusual, but, if the negligence or breach of duty was established, the fact that there was shock and not physical injury would make no difference. The corporation replied that claims would be indefinitely multiplied if the limits of injury or apprehended injury were extended. They distinguished between terror and disgust; no damages, they said, ought to be awarded for the mere suffering of distaste or horror. The Court of Appeal seemed to be doubtful if it would have reached the same conclusions as the court below with regard to the injury suffered. But the Lords Justices were not prepared to upset the Liverpool tribunal's findings of fact. Fear that unfounded claims would be multiplied was not to be allowed to influence a court; each case would be dealt with on its own merits. It might be that the mourners were peculiarly susceptible to being disastrously disturbed by any untoward accident to the trappings of sorrow. But anyone who is guilty of negligence must put up with those idiosyncrasies of his victim which may increase the likelihood or extent of damage. It is no answer to a claim for a fractured skull to say that its owner had a particularly fragile one. Leave was given to take the case to the House of Lords, on condition that the Liverpool corporation undertook to pay the plaintiff's costs in any event. Thus a further development in the law of damages for shock will be examined by the highest legal authority.

It was usual at one time to say that no damages could be recovered for mere mental suffering unattended by physical injury. Where two ships were in collision, an employee in one vessel was refused statutory compensation for shock produced by the imminence of the disaster. Cases of physical injury were simple enough. Laymen could see the injury. Nervous injuries were different; only the expert could detect them, and the courts could not feel safe in allowing merely subjective symptoms to be exploited. In 1897, however, came the case of Wilkinson *v.* Downton, where a practical joker frightened a woman by telling her that her husband had just had a bad accident and had broken both his legs. The woman was allowed to recover damages. Four years later, in Dulieu *v.* White, a driver's negligence which caused the plaintiff to be frightened at imminent peril was held to be a good cause of action. So far the plaintiff had not succeeded unless he or she could show shock due to fear for himself or herself. Then came Hambrook *v.* Stokes Bros. in 1925 where a mother died of shock caused by seeing her child injured. A lorry-driver had left his vehicle on an incline, with the engine running and only the hand-brake applied. The lorry ran down the hill and injured the child. The mother had not, it seems, been herself imperilled. The Court of Appeal held that damages could be awarded where the negligent act of the driver caused the mother a shock—resulting from what she herself saw but not if it were something told her by others—if the shock were due to a reasonable fear of immediate personal injury either to herself or her children. It was deemed obvious that a mother would feel special emotion where her child was in peril. Lord Justice Atkin was ready to extend the principle to bystanders as well, if their shock resulted from the negligent act. And now the Liverpool case has widened the principle still further by allowing an award for shock caused by peril to a dead body, though here, as in the Hambrook case, it is the association of close family relationship which makes the shock so deeply felt.

Thus, as medical science has become better able to describe and classify mental and nervous symptoms, the courts have appreciated their significance. It is realised that a woman's nerves may be as much a part of her personality as her teeth or her limbs. The expert witness provides the proof of the nervous shock. The judge rules that the shock can be the consequence of the negligent act or, to put the point in legal language, that the shock is not too remote a consequence to give rise to legal liability. It will be interesting to see what the House of Lords will say when it reviews the Liverpool case on final appeal.

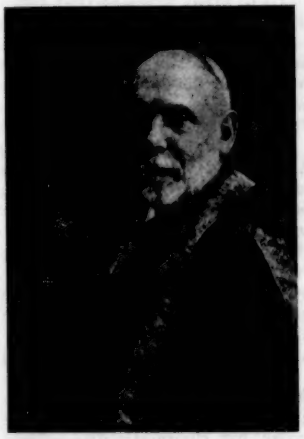
WINGFIELD-MORRIS ORTHOPÆDIC HOSPITAL, OXFORD. Lord Nuffield has given a cheque for £31,383 for capital expenses to this hospital. The gift will be used to provide new nurses' quarters, new quarters for the resident medical officer, an ultra-violet ray room, and for the conversion of workshops into new wards.

OBITUARY

SIR COOPER PERRY, G.C.V.O., M.D. Camb., F.R.C.P.

Sir Cooper Perry died at his home at Worthing on Dec. 17th at the age of 82. Though a great teacher of medicine and a man of outstanding scholarship, he will chiefly be remembered for his administrative work more especially for Guy's Hospital and London University.

Edwin Cooper Perry was the son of the Rev. E. C. Perry. Having left Eton, where he was captain of the school, he passed to King's College, Cambridge, of which he became a fellow. He was senior classic, and such a good one that on the day that the list appeared he is said to have received a telegram from Wren and Gurney, the famous coaching firm, offering him £1000 a year if he would join them. He declined, took to the study of music, and prepared the anthem book still in use in King's chapel. Next he studied philosophy in Leipzig. Finally he turned to medicine, and after being house surgeon to Treves at the London became assistant physician at Guy's in 1887. There he was in charge of the dermatological department, and for many years performed the post-mortem examinations. There was much competition among the students to work with him, for he took great trouble to teach, sometimes caustically, so that the student never made the same mistake a second time.



Cooper Perry set out to serve others, to help to make things better, not by preaching or writing, for he loathed publicity, but by quietly working. He had exceptionally great ability in many directions; he decided to use it in administration and organisation. As dean of the medical school at Guy's he reformed the system of student appointments, converting an oligarchy into a democracy; he built the residential college and club, the first to be attached to any medical school, and was the first warden of it. When he went to Guy's there was no dental hospital for the two million poor served by the hospital. Perry built the present large dental buildings and founded the dental school. During his deanship new medical school buildings, the Wills library, new bacteriological and new pathological buildings appeared, and the Gordon museum sprang into existence. In 1893 he resigned the post of dean to the school and became superintendent of the hospital, an office he held till 1920. The reforming organiser soon made his mark, the fine home for nurses was built, new operating theatres appeared, and, although the outside remained unaltered, the interior of the hospital was completely modernised. He was as efficient in small things as in great; for example, he brought out three editions of the hospital pharmacopœia.

The South African war showed that change was necessary in the R.A.M.C. Sir Alfred Fripp, who had been out there, was persistent in pressing for an inquiry. Knowing Perry's organising power he secured his help, and both of them were on the inquiry committee that was set up. The result of the committee's labours was enormously to increase the efficiency of the R.A.M.C. For his work in this matter Perry received a knighthood. The first Lord Cromer, through the Government, applied to the Royal College of Physicians to recommend someone to go to Cairo to organise medical and pharmaceutical schools for Egypt. The College advised that Perry should go. He went; the work was quickly and well done, and it has not been found necessary to alter the principles he laid down many years ago. He received an honorary degree from the University of Egypt in 1929. He was active in furthering the State registration of nurses, and was one of the moving spirits and one of the hardest workers in the foundation of the College of Nursing. He had much to do also with the founding of the Chartered Society of Massage. In 1917 he was vice-chancellor, and a few years later principal of the University of London, which awarded him the honorary degree of LL.D. in 1934. For many years he was on the distribution committee of King Edward's Hospital Fund. Last year he received the distinction of the G.C.V.O. He served on the Voluntary Hospitals Commission, and also on departmental committees on post-graduate medical education, the disinterested management of public houses, and the Royal Veterinary College. He was a governor of Guy's Hospital, of the Royal Holloway College, and of Bedford College, and, at the time of his death, was busy as the chairman of the London School of Hygiene and Tropical Medicine.

Cooper Perry was a really great man who might have followed other careers with equal distinction; he chose the path he did because he thought he could thus do most good to his fellows. He rarely appeared in public and never attended meetings in which he was not directly concerned. Some found him abrupt and sarcastic, but he was only thus to those who were self-seeking or who came to discuss with him without properly understanding the matter in hand. Otherwise he was sympathetic, kindly, and helpful to all who worked with him. They venerated and loved him. When he left Guy's a meeting was held to present him with several gifts; the large court room was packed with staff—medical, surgical, specialist, and dental—with past and present students, with the staff of the medical and dental schools, the nursing staff, the administrative staff, and members of the works department. Outside his work he was fond of music and the classics, he was a good and witty talker; nothing could be more pleasant than a dinner of four congenial spirits of whom Perry was one. His desire to help showed itself in private as well as in public and there are many now leading a happy and comfortable life who owe it to him.

In 1870 Cooper Perry married Caroline Matilda McManus, who died in 1935. He leaves one daughter.

EDWARD LAWRENCE FOX, M.D. Camb., M.R.C.P.

Dr. E. L. Fox, who died at Kingsbridge on Dec. 11th, was the doyen of the medical profession in Plymouth. Educated at Cambridge and St. Bartholomew's Hospital, he qualified in 1885 and took his Cambridge M.D. in 1890. He acquired post-graduate experience in two Liverpool hospitals before settling in Plymouth, and became M.R.C.P. in 1891. In October of the following year he reported in the

British Medical Journal a case of myxœdema successfully treated with thyroid extract given by mouth, which represented a substantial advance on the treatment by injection introduced by G. R. Murray twelve months previously.

Elected to the staff of the South Devon and East Cornwall Hospital (now the Prince of Wales's Hospital) in 1894, he gave himself thenceforward to the life of the town and won the respect of his fellow citizens. He had strong views, and maintained them against any opposition; but his strong and upright character included also great generosity. His kindness and help, especially to the poor, were unfailing; indeed the poorer the patient and the more chronic the disorder the more trouble he took. He carefully abstained from self-advertisement and his considerable benefactions to charity were made anonymously.

Dr. Fox was for many years physician to the Royal Eye Infirmary and to the Plymouth Public Dispensary. During the late war he held a special reserve commission as lieut.-colonel in the Royal Army Medical Corps, and in war hospitals at Plymouth and Tavistock had charge of the wards for neurological cases, in which his interest mainly lay. He resigned from the Prince of Wales's Hospital in 1924 under the age-limit.

Dr. ALICE NEVILLE VOWE JOHNSON, who died at Wimbledon on Dec. 14th, was born in London in 1869 and spent five years at the Mansfield House University Settlement in Canning Town before entering the London School of Medicine for Women where she qualified L.S.A. in 1893. In the following ten years she took a number of higher diplomas, including the M.D. Brux., D.P.H. Camb., and F.R.C.S.I., while she was gaining clinical experience at the Elizabeth Garrett Anderson Hospital, at various mission hospitals, and at the Carmarthen joint mental hospital. Later she was medical officer to the Lambeth Schools Infirmary and medical inspector to the Board of Education. Of the many calls on her time her best-known work was at the Bird in the Bush welfare centre, which she helped Mrs. Una Morris to start in a little shop at 616, Old Kent-road. Here she was medical officer for twenty years, and it was largely by her doing that difficulties were surmounted and the centre firmly established. Colleagues at the centre speak of Dr. Johnson's kindness and thoughtfulness. She was, it is said, the friend of all the lame dogs.

A DEMONSTRATION OF PHYSICAL TREATMENTS.—The London branch of the Chartered Society of Massage and Medical Gymnastics held a demonstration of remedial treatments on Dec. 16th at the Middlesex Hospital. The procedures were carried out by members of the society and witnessed by a large gathering of medical men and women. Miss C. Sparger showed a series of exercises, performed to music, in which the technique of ballet-dancing was skilfully applied to the correction of postural deformities, especially of the feet. Miss M. Randall exhibited another series designed to improve the physical and mental efficiency of the expectant mother, and to train the muscles and joints of the pelvis for the work of carrying and expelling the child. Miss H. Angove showed how sufferers from asthma can be relieved by training in relaxation and deep breathing, and Mrs. Guthrie Smith, principal of the Swedish Institute, demonstrated exercises in slings for infantile paralysis patients and others who need to be relieved of the handicaps of friction and gravity. Three methods of applying short-wave current to the antra and sinuses were shown by Miss G. E. Bristow, and Miss B. Copestake instructed the visitors in the preparation of Pistany mud packs for the treatment of rheumatism and sciatica.

EMPIRE RHEUMATISM COUNCIL

Lord HORDER, presiding over the annual meeting of the Council on Monday last, said that progress in the coördination of the resources of the community against rheumatism had been continuous. The Council had during the year taken over the publication of the "Reports on Chronic Rheumatic Diseases" issued by the British committee on chronic rheumatic diseases of the Royal College of Physicians, which was now dissolved, and in January a new series would be started under the editorship of Dr. C. W. Buckley, Dr. W. S. C. Copeman, and Mr. Timbrell Fisher. Unfortunately the financial needs of the Council were now really pressing. Almost every month brought proposals of great moment that could not be put into effect immediately, and valuable and urgent work waiting to be done would call for three times the present resources. The naval research foundation would cost at least £5000, apart from the costs which will be met by the Admiralty, and though a generous gift of £1500 had been received from the Sir Halley Stewart trust towards this, more help was urgently needed. It had been suggested that a brochure or leaflet should be issued by which laymen, as well as doctors, would be told about what was being done in the campaign.

Mr. J. SPEDAN LEWIS said that when one looked at the total sum contributed and then saw that the estimated damage to the community in a single year was £50 million, one felt like a microscopic David advancing against a colossal Goliath.

Sir ERNEST GRAHAM-LITTLE, M.P., referred to the House of Commons discussion on the Cancer Bill. The imagination of the House, he said, was undoubtedly stirred by the information that 70,000 persons died of cancer every year, but rheumatic disease was really far more important to the community. The disability, the enormous amount of unemployment, and the individual pain and discomfort were not perhaps so clearly visualised as that appalling number of deaths. Because rheumatic disease was not a sensational figure in the mortality tables, it had not captured the public imagination as it ought to do. That was one of the reasons why more publicity of the damage done by rheumatism should be offered to the public. Well-directed research was required and the lay public ought to have a clear lead from the medical profession. One of the great services of the Council was that it had united medical opinion. Sir Ernest added that there was an immense waste of material for research in the great hospitals.

Sir WILLIAM WILLCOX said that the work of the hospitals in the treatment of rheumatism had not been sufficiently recognised; at St. Mary's Hospital many cases of arthritis were being investigated. It was a mistake to remove any particular class of patients, unless their condition was infectious, from the teaching hospitals; the students did not see them and the possibility of research was perhaps lost.

Mr. A. G. TIMBRELL FISHER said that a democratic Government must be influenced by public opinion, and the Council was determined to bring home to the people of the country, and through them to the Government of the day, the vital importance of rheumatism.

The annual report of the Council estimates that specialised treatment of rheumatism is available for less than 10 per cent. of adult sufferers and less than 25 per cent. of juveniles. In England and Wales there are thought to be over a million adults, and half a million juveniles, suffering from rheumatism.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS

Scottish Government and the Board of Control

IN the House of Commons on Dec. 13th Colonel COLVILLE, Secretary of State for Scotland, moved the second reading of the Reorganisation of Offices (Scotland) Bill. He said that the Bill, which was based on the report of the gommittee on Scottish Administration, was perhaps the most comprehensive reform of government in Scotland since 1885. It was intended that in future there should be four main Scottish Departments—the Departments of Education, of Health, and of Agriculture, and a new Scottish Home Department which, broadly speaking, would take over the functions of the Scottish Office, the Fishery Board, and the Prisons Department. The Bill also dealt with the reorganisation of the General Board of Control. It has been represented to the Committee on Scottish Administration by certain witnesses and the intimate relation between mental and physical health made it desirable to abolish the Board altogether and to transfer its functions to the Department of Health. The same conclusion was reached by the Committee on Scottish Health Services in 1936. The Committee on Scottish Administration, however, recommended that the Board should be retained, that its staff should be strengthened, and that it should be associated more closely with the Department of Health. The existing Board was therefore being reconstituted. It would consist of a paid whole-time chairman, who would be an officer of the Department of Health; the two existing paid medical commissioners; a part-time paid legal commissioner; a representative of the Scottish Education Department; and two unpaid members representing the general public. The functions of the Secretary of State relating to lunacy and mental deficiency would be discharged through the Department of Health and not through the Scottish Office as at present.—Mr. T. JOHNSTON expressed the opinion that more far-reaching measures were required for the better administration of affairs in Scotland. If the Secretary of State and the Department of Health were to have the last word, subject to an appeal to the Sheriff, as to when a person should be taken to a mental home compulsorily, or when he should be excluded from a mental home at his own request, the Secretary of State would be involved in a great deal of unnecessary political trouble. Members of Parliament would be subject to pressure, although they were not appropriate judges as to when a man was in ill health or not. —Sir J. GILMOUR, who was Chairman of the Committee on Scottish Administration, said that it was inevitable that whoever had to give the final decision must have medical advice at his disposal. If the committee had accepted the view that the Board of Control should be abolished and that the responsibility should rest on the Sheriff that would have put the Sheriff in an impossible position. He hoped therefore that the Board of Control would continue to have the power to act and investigate cases.—Mr. WESTWOOD said that the Departmental Committee on Scottish Health Services, on which he had served, took evidence from no fewer than 70 of the greatest medical men in Scotland and England. After hearing that evidence the Committee unanimously recommended the abolition of the Board of Control and that the work of dealing with mental troubles should be considered from an entirely different angle under the Department of Health. He was still an unrepentant subscriber to that point of view. —Mr. T. M. COOPER, Lord Advocate, replying for the Government, said that in considering the question of the Board of Control the Gilmour Committee were in the position of an appellate tribunal reviewing the evidence which had been produced by the Scottish Health Services Committee. Since the report of the Gilmour Committee the question had been re-examined by the Secretary of State who had decided that the recommendation of the Gilmour Committee should be adopted. On that the Government took their stand. They had to give the fullest weight not only to the liberty of the subject but also to the safety of the public. He meant the safety of those who unfortunately might fall victims to the criminal or semi-criminal acts of those who were mentally defective or insane. This highly delicate and semi-judicial function seemed to be more appropriate for a body such as the Board of Control than for a Government Department or a Minister subject to special pressure and to other exceptional considerations.

Safety in Mines

On Dec. 14th in the House of Commons Lieut.-Comdr. FLETCHER suggested that, in view of the increasing number of accidents to boys employed in mines, the employment underground of boys under 16 should be prohibited and that young persons employed above ground should be given a course of training in the principles of safety during their hours of employment, and that when they reached the age of 16 and were employed underground they should not be employed in connexion with machinery and should be under the supervision of a charge-hand for the first three months. He said that between 1920 and 1936 2,399,492 miners were injured in the pits and 16,723 were killed. In 1937 the proportion of boys over 18 who were killed was 0·89 per 1000; but the figure for boys under 18 was 1·09. In the whole country in the years 1935, 1936, and 1937 there were 149 boys under 18 killed and in 1935 and 1936 there were 22,772 boys under 18 injured. They were all killed or injured below ground. The death-rate among boys was almost as high as that for all other persons employed in mines. Of every 1000 miners injured 229 were under 16 and as the age went up the number decreased.—Mr. PEAKE, in moving an amendment that the employment of boys underground should be prohibited except after suitable training above ground and subject to proper supervision, said that the amendment represented the greatest common measure of agreement which the House of Commons was likely to reach on this question. It was not the number of accidents to boys in mines that was increasing but the accident-rate per 1000 employed, a very different thing. Although the actual number of accidents had fallen the effective rate per 1000 employed had increased owing to a decrease in the number of boys employed underground from 19,200 in 1935 to 16,000 in 1937. The industry was alive to the problem. More training and better supervision probably represented the best line of approach to it.—Captain CROOKSHANK Secretary for Mines, replying to the debate, said there was agreement in all quarters of the House that the figures for accidents to young persons in the pit under 16 years of age was deplorable. A Royal Commission which had been sitting on this question practically during the whole lifetime of the present Parliament had now signed their report which would be published in a few days. It would be better to accept the amendment and wait until the Commission's recommendations were available before deciding on what action was necessary.

Adoption of Children

In the House of Commons on Dec. 16th Miss HORSBRUGH secured the unanimous second reading of a private Bill for regulating the adoption of children, after Mr. Geoffrey Lloyd had given it official blessing. Miss Horsbrugh was chairman of a departmental committee set up by Sir John Simon, when he was Home Secretary, to study the difficulties and methods of child adoption, particularly when arranged by associations or groups. While Miss Horsbrugh and Mr. Lloyd agreed that some adoption societies are doing excellent work, there are undoubtedly abuses

which ought to be stopped. Mr. Lloyd's feeling was that these abuses arose less from lack of scruple than from want of staff and machinery. Under the Adoption of Children (Regulation) Bill it will be an offence for any body of persons to arrange adoptions unless registered on an approved list. The Bill provides for obtaining a certificate of the child's health, including a Wassermann test of mother and child. Miss Horsbrugh gave some examples of existing practice under which a complicated health certificate had been filled in by the mother herself; in one case it was stated that the child was healthy and of healthy parentage when the mother was mentally deficient and had a crippling affection of the legs and paralysis of an arm. The Bill provides for inspection of reports and accounts of adoption societies and makes it illegal for private individuals to advertise for a child or to advertise a child for adoption. Miss Horsbrugh holds that no British child should be given away to people of any other country or be naturalised abroad without a chance of deciding his own national adherence. The Bill lays it down that if children are sent to British residents in the Dominions or other countries a licence should be obtained from the chief magistrate at Bow-street analogous to the licence for children going abroad as entertainers. The Bill applies also to Scotland.

Drug Traffic in China

In the House of Commons on Dec. 19th, in answer to a series of questions, Mr. BUTLER agreed that there was reason to fear that the trade in narcotics was rapidly expanding in the area of Shanghai occupied by the Japanese. He was aware of the existence of 18 factories serving this trade in the Peking and Tientsin area but had no evidence that they were sanctioned or encouraged by the Japanese. The published figures for the Manchurian budget for 1938 showed a marked increase in the sale and in the purchase of opium by the Government monopoly.—In answer to an inquiry, Mr. GEOFFREY LLOYD said there was no reason to suspect that drugs manufactured in the Far East were entering this country.

Sale of Contraceptives

Mr. SIMMONDS on Dec. 16th moved the second reading of the Contraceptives (Regulation) Bill. He said that the Bill merely circumscribed some of the worst offences against public opinion committed by traders in contraceptives. The Bill provided that no person shall:—

(*a*) Display, or cause or knowingly permit to be displayed, in, upon, or outside any shop, in such manner as to be visible to persons outside the shop, any contraceptive, or any picture or written description of any contraceptive, or any box, bottle, tube, or wrapper containing or purporting to contain any contraceptive; or

(*b*) Sell, hawk, or offer or cause to be offered for sale, in any street, or public place, or by means of any automatic machine so placed that it can be used by persons in a street or public place, any contraceptive.

It also prohibited the distribution of contraceptives or literature dealing with contraception to unmarried people under 18 except at their request. The Bill did not prevent anyone who wanted to purchase contraceptives from having every reasonable opportunity to do so. The only facility which would be lost would be the purchase through slot machines. Nor did the Bill interfere in any way with the distribution of the literature of societies. The Bill did not raise the question of aphrodisiacs or sexual stimulants, because the promoters were informed that many people who regarded the use of contraceptives as moral would take the greatest objection to coupling contraceptives in one measure with these obnoxious drugs. The Bill also did not touch abortifacient devices.—Sir WILLIAM WAYLAND proposed that the subject should be dealt with as a whole by a Bill introduced after the publication of the report of the Departmental Committe on Abortion.

He feared that the Bill would do more harm to the cause which Mr. Simmonds advocated than the advertisements of which he complained. Abortion, which had been declared by medical men to be the cause of bad health in women who practised it, would probably be avoided by the use of contraceptives. He thought that the reduction in venereal diseases was largely due to the use of contraceptives.—The debate stood adjourned.

QUESTION TIME

WEDNESDAY, DEC. 14TH

Women Ambulance Drivers for Civil Defence

Mr. ROSTRON DUCKWORTH asked the Lord Privy Seal whether, in connexion with the formation of a National Register, it was proposed to offer training in ambulance driving to women motorists who would wish to undertake this duty, but who had had no experience of handling heavier vehicles.—Sir JOHN ANDERSON replied: Yes, Sir, and this will be made clear in the National Service Guide.

Gold Coast Medical Service

Mr. WILSON asked the Secretary of State for the Colonies whether he could give for the Gold Coast, in the case of European and African medical officers having, respectively, the same qualifications, the period of probationary service, the periodicity and amount of salary increments, and the maximum salary attainable; whether in either case there was an efficiency bar and if quarters were provided; and whether there were any appointments open to Europeans only.—Mr. MALCOLM MACDONALD replied: The scale of salary for a European medical officer in the Gold Coast is £660 a year for three years, then £690 a year rising by annual increments of £30 to £840 a year, then, subject to passing an efficiency bar, £880 a year, rising by annual increments of £40 to £1000 a year. The period of probation is three years and free quarters are provided. The scale of salary for an African medical officer in the Gold Coast is £500 a year, rising by annual increments of £25 to £600 a year, thence subject to passing an efficiency bar rising by annual increments of £30 to £720 a year. The period of probation is three years and free quarters are not provided. Whilst awaiting probationary appointment, an African (suitably qualified) may be employed as a junior medical officer in one of the larger hospitals of the Gold Coast for a period of preliminary training during which he is granted salary at the rate of £400 a year. At present the higher posts in the Medical Department of the Gold Coast are normally filled by European officers belonging to the Colonial Medical Service. No appointments are however actually reserved for European officers, and in the medical, as in the other branches of the Service, African officers are fully eligible to be considered on their merits for promotion to any appointments for which they may be qualified.

Nursing Services Committee

Mr. BURKE asked the Minister of Health when the reports of the Inter-Departmental Committee on the Nursing Services would be forthcoming.—Mr. ELLIOT replied: I understand that this committee are likely to submit an interim report in the very near future.

Royal Commission on Workmen's Compensation

Mr. ELLIS SMITH asked the Prime Minister if he could give the names of the members who would constitute the Royal Commission that was to investigate the question of workmen's compensation; when the Commission was expected to meet; and when it was hoped to terminate the proceedings.—Mr. CHAMBERLAIN replied: Yes, Sir. The King has been pleased to approve the setting up of a Royal Commission to inquire into the subject of Workmen's Compensation, constituted as follows:—

Sir Hector James Wright Hetherington, LL.D. (chairman); Mr. Robert Reid Bannatyne; Mr. John Smith Boyd; Mr. Arthur Belcher Cauty; Miss Grace Drysdale; Mr. Reginald Cheyne Elmslie, F.R.C.S.; Mr. Edgar Hackforth; Mr. George Alfred Isaacs, J.P.; Mr. William Lawther; Mr. John Adam Lillie, K.C.; Mr. Clarence

Thomas Albert Sadd, J.P.; Mr. J. L. Smyth; His Honour Judge William Stewart; Mr. F. J. Williams; Mr. W. D. Woolley; and Mrs. Barbara Wootton.

It will be for the chairman to arrange for the first meeting, but I have no doubt it will be held as soon as reasonably practicable. I cannot forecast at present how long the inquiry will take.

Mr. SMITH: Will the Prime Minister consider introducing some immediate reforms, such as increasing the maximum amount of workmen's compensation in the case of miners' nystagmus and silicosis while the Commission is sitting?—Mr. BUCHANAN: Will the right hon. gentleman consider recasting the Commission to make it smaller and more effective, or introduce one or two of the more urgent reforms pending the Commission's report?

Mr. CHAMBERLAIN: I understood it was thought desirable the Commission should be representative, and that is the explanation why it is rather large. I am quite aware of the urgency of some of the problems the Commission has undertaken to survey, and I am sure they will take into consideration their urgency and will endeavour to expedite some part of their report.—Replying further to Mr. Buchanan Mr. Chamberlain said that he would represent to the Commission that on one or two matters an interim report might be made, but, he added, I must leave it to them to say how soon they can deal with these matters.

Dairy Herds and the Tuberculin Test

Sir ERNEST GRAHAM-LITTLE asked the Minister of Health whether he was aware that many instances had recently occurred when cows that were T.B. reactors, after being weeded out from a T.T. herd, had been retained by the same owner for the production of accredited and ordinary milk; and whether he intended to take action to give better protection to the public health in connexion with such cases.—Mr. ELLIOT replied: Cows showing a reaction to the tuberculin test are not, on that account, slaughtered, since reaction to the tuberculin test does not in itself imply infection in the milk of a reactor. The question of improving the standard of the milk-supply of the country is receiving active attention on the part of H.M. Government.

Sir F. FREMANTLE: Does not that show the absolute necessity for giving local authorities power to secure the pasteurisation of milk?

Jewish Doctor and the British Visa

Mr. WEDGWOOD asked the Home Secretary why a British visa had been refused to a Jewish doctor, although he had an affidavit for America, who had been offered hospitality while in England by a member of the House of Commons had also guaranteed that he should not practice while in England, and had a credit balance of £1000 at the Midland Bank placed there by his aunt, a British citizen; and, as he was in danger of immediate arrest, would he have the visa authorised at once.—Sir SAMUEL HOARE replied: I have been in communication about this case with the right hon. and gallant Member, and I am proposing to consider it further in the light of the general considerations mentioned in my reply to his previous question.

Hospital Patients and Voting Facilities

Mr. DAY asked the Home Secretary whether, in view of the fact that it was impossible for patients confined to a hospital to register their votes, despite the fact that they were on the register, he would consider introducing legislation which would give these persons an opportunity of registering their votes.—Sir SAMUEL HOARE replied: The proposal that sick persons should be allowed to vote otherwise than at a polling station raises serious practical difficulties, but it has been noted for consideration when opportunity arises.

Scientists and National Service

Mr. MARKHAM asked the Lord Privy Seal whether in the arrangements for a national register, consideration had been given to the necessity for a separate classification of scientists of all kinds; and whether consideration had been given to the various ways in which their services might best be utilised in an emergency.—Sir JOHN ANDERSON replied: Yes, Sir. Arrangements for this classification are already well advanced. As regards the second part of the question the Minister of Labour, in consultation with me, is appointing a Committee to advise on the best means of utilising in an emergency the services of men of science, members of professional organisations and persons with special administrative experience.

FRIDAY, DEC. 16TH

Smokeless Zone for Manchester

Mr. LYONS asked the Minister of Health whether, in view of the widespread damage to health and property caused by the emission of smoke and soot from industrial furnaces and domestic grates, he proposed to encourage the establishment of a smokeless zone in and around Manchester; and what progress had been made towards the completion of these arrangements.—Mr. ELLIOT replied: I understand that the Manchester Corporation have been advised that they would need to obtain special powers from Parliament to enable them to prescribe smokeless zones. Until I have had an opportunity of seeing the proposed clauses in any Bill which the Corporation may promote for the purpose, I could not anticipate what advice I should offer to Parliament on such a Bill.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 10TH, 1938

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 0; scarlet fever, 1943; diphtheria, 1512; enteric fever, 24 (30 "expected"); pneumonia (primary or influenzal), 794; puerperal pyrexia, 166; cerebro-spinal fever, 25; acute poliomyelitis, 27; acute polio-encephalitis, 3; encephalitis lethargica, 2; dysentery, 44; ophthalmia neonatorum, 77. No case of cholera, plague, or typhus fever was notified during the week.

The combined notifications of acute poliomyelitis and acute polio-encephalitis total as follows for the current week and the previous 20 weeks (working backwards): 30, 37, 42, 47, 53; 73, 74, 88, 85, 68, 56, 63, 83, 76, 82, 76, 83, 87, 63, 41, 29.

The number of cases in the Infectious Hospitals of the London County Council on Dec. 16th was 3336, which included: Scarlet fever, 771; diphtheria, 1131 (carriers, 38); measles, 10; whooping-cough, 497; puerperal fever, 10 mothers (plus 6 babies); encephalitis lethargica, 291; poliomyelitis, 9. At St. Margaret's Hospital there were 29 babies (plus 16 mothers) with ophthalmia neonatorum.

Deaths.—In 126 great towns, including London, there was no death from small-pox or measles, 1 (1) from enteric fever, 4 (0) from scarlet fever, 10 (1) from whooping-cough, 26 (4) from diphtheria, 36 (15) from diarrhœa and enteritis under two years, and 26 (1) from influenza. The figures in parentheses are those for London itself.

Hull had 2 deaths from scarlet fever. Fatal cases of diphtheria were scattered over 19 great towns, 3 at Liverpool. West Ham and Birmingham each reported 4 fatal cases of diarrhœa.

The number of stillbirths notified during the week was 253 (corresponding to a rate of 40 per 1000 total births), including 34 in London.

KING'S COLLEGE HOSPITAL.—The committee of management of this hospital have decided that one of the medical registrars shall be resident and have appointed Dr. R. B. Niven, who was a South African Rhodes scholar, to hold this office. Dr. G. A. Kiloh has been appointed first holder of another medical registrarship which has been given the name of Sir Raymond Crawfurd, a former dean of the medical school and senior physician of the hospital. Dr. G. R. Steed has been appointed to the Sambrooke medical registrarship.

MEDICAL NEWS

University of London

At recent examinations the following candidates were successful :—

T. B. Griffiths, Westminster; Laurence Honeywill (university medal), Univ. Coll.; M. E. MacGregor, St. Thomas's; C. M. Miller, Leeds; C. S. Smith, Middlesex; R. B. Terry, St. Bart.'s; Margaret D. Thomas, Roy. Free; and Mary E. E. Ward, Univ. Coll. (with honours). B. S. S. Acharya, St. Bart.'s; A. G. Apley, Univ. Coll.; J. R. Ascott, St. Thomas's; Romana G. Bartelot, Univ. Coll.; D. M. Beaugié, London Hosp. and Glasg.; R. D. Blachford, Guy's; Natalia S. Blumenfeld, Roy. Free; D. J. A. Brown, St. Bart.'s; K. C. Brown, St. Bart.'s; Margaret M. Burton, Roy. Free; W. E. Clarke, Charing Cross; J. C. A. L. Colenbrander, Guy's; Dorothy L. Crossley, Roy. Free; E. R. Dansie, King's Coll.; D. A. Davies, London Hosp.; Joan M. St. V. Davies, Roy. Free; A. S. Dods, Westminster; A. M. Edwards, Guy's; J. A. C. Edwards, St. Bart.'s; Phyllis M. Edwards, King's Coll.; B. H. Ellis, St. Bart.'s; D. G. Evans, St. Bart.'s; J. A. P. Evans, St. Mary's; C. C. Evill, St. Bart.'s; C. G. Fagg, St. Bart.'s; B. R. Fink, Univ. Coll.; D. S. Foster, St. Mary's; Henry Foster, Guy's; J. P. Fox, Westminster; D. F. Freebody, Guy's; Ysobel M. Garland, Roy. Free; Margaret F. Gillison, Roy. Free; Janet D. Gimson, Univ. Coll.; H. M. Goldberg, Univ. Coll.; Jean E. Grant, Roy. Free; L. J. Grant, London Hosp.; S. I. Green, Guy's; C. L. Greenbury, Univ. Coll.; W. S. Hacon, Guy's; J. A. G. Hair, Univ. Coll.; Max Halberstaedter, St. Bart.'s; N. W. A. Harvey, St. Thomas's; Doreen Jamieson, Roy. Free; S. M. Jenner, St. Mary's; Arthur Jordan, St. Bart.'s; J. B. Kinmonth, St. Thomas's; C. C. Kirby, St. Mary's; G. S. A. Knowles, London Hosp.; Guanbee Kruatrachue, St. Bart.'s; A. S. Lee, Guy's; D. R. Levinson, Guy's; C. V. Lewis, Middlesex; A. W. Little, St. Bart.'s; K. N. Lloyd, London Hosp.; Myer Lubran, Guy's; Margaret E. McLaughlin, King's Coll.; R. J. H. McMahon, St. Bart.'s; D. E. Macrae, St. Bart.'s; Elizabeth C. Marshall, Univ. Coll.; H. A. C. Mason, St. Thomas's; S. W. Maxwell, Univ. Coll.; Mary D. Mellersh, Roy. Free; P. S. Meyrick, Univ. Coll.; G. D. N. Milne, Guy's; Elizabeth M. Mitchell, Roy. Free; J. D. N. Nabarro, Univ. Coll.; Gladys L. Neill, King's Coll.; C. S. Nicol, St. Mary's; A. J. Nimmo, St. Thomas's; D. E. Parry, St. Mary's; Edith A. S. Parry-Evans, Roy. Free; Thomas Partington, St. George's; K. G. Pascall, Guy's; Ruth Penion Jones, West London Hosp. and Brist.; Gloria H. Platt, Roy. Free; S. S. F. Pooley, St. Thomas's; D. W. Pugh, London Hosp.; Elisabeth C. Randell, Roy. Free; W. J. Rees, Univ. Coll.; Nora Reid, King's Coll.; Nancy E. G. Richardson, Univ. Coll.; R. B. K. Rickford, St. Thomas's; A. C. Ricks, Guy's; A. T. M. Roberts, Guy's; L. F. W. Salmon, Guy's; D. K. Sambrook, St. Thomas's; C. R. Savage, St. Thomas's; W. J. Shannon, London Hosp.; Philip Shemilt, St. Thomas's; Gregory Shneerson, St. Mary's; M. M. Shrinagesh, St. Bart.'s; J. R. Simpson, St. Bart.'s; J. H. Smart, Guy's; Margaret D. Snelling, Roy. Free; G. R. Staley, St. Bart.'s; Margaret M. Strange, Roy. Free; Mary R. Thompson, Leeds; L. C. Thomson, Guy's; K. B. Thornton, St. Thomas's; John Todd, King's Coll.; Betty Walker, Roy. Free; J. W. B. Waring, St. Bart.'s; C. P. Warren, London Hosp.; W. R. W. West-Watson, Leeds; M. H. G. White, Middlesex; J. H. Whittles, King's Coll.; R. F. Wyatt, St. Thomas's; George Wynn Williams, Westminster; and R. O. Yerbury, Guy's.

The following students have passed in one of the two groups of subjects :—

Group I.—L. D. Arden, R. H. Barrett, Mary Brandon-Jones, G. L. Burgess, John Burton, Mercy S. Cam, H. B. O. Cardew, C. D. Chilton, H. D. Cockburn, G. P. Crean, T. T. Davies, J. J. Davis, Ursula M. Dick, J. E. Dickson, C. J. Evans, W. K. Frewen, P. A. Gardiner, Beryl M. Gee, Joseph Henry, R. N. Houlding, Barbara J. Hussey, M. T. I. Jones, R. R. McSwiney, F. P. S. Malone-Barrett, Harry Matthews, Aubrey Miller, H. E. Moody, Rosie Morris, R. E. Newman, Sylvia D. Orchard, J. F. Perredes, G. L. Pett, A. S. Porter, Josef Sondheimer, Susan M. Tracy, and Joan Wagstaff.

Group II.—Raymond Asquith, J. C. Ballantyne, P. B. Banaji, Ailsa Bannerman, D. A. G. Brown, Amelia E. Burch, J. A. Burnett, Diana M. M. Carr, Phoebe Charlton, Dilys L. Davies, D. M. Dunn, P. S. Fuller, Leonard Goodman, Sydney Grossmark, Jack Herbert-Burns, A. P. Hick, J. D. O'D. Lavertine, Dorothy K. Paterson, Matthew Radzan, S. B. Smith, P. D. Swinstead, John Watkins-Pitchford, and N. A. F. Young.

The Graham scholarship in pathology has been awarded to Dr. R. M. Calder.

The winter conversazione of members of this society and other medical graduates of the University of London was held at the Wellcome Research Institution by kind invitation of Dr. C. M. Wenyon, F.R.S., the director-in-chief, on Thursday, Dec. 15th. Sir James Walton, the president, received the guests and Dr. S. H. Daukes, director of the Wellcome Museum of Medical Science, outlined the objects of the museum, its system of arrangement, and recent developments, and afterwards led the visitors on an inspection of the exhibits.

The annual meeting and dinner of the society will be held in the Langham Hotel on Tuesday, May 2nd.

University of Manchester

At recent examinations the following candidates were successful :—

FINAL EXAMINATION FOR M.B., CH.B.

Muriel I. R. ApThomas, H. B. Austin, Kenneth Harrison, R. B. Hollos, P. N. Holmes, D. N. Kiff, Jean Mason, John Meynell, Mary B. Oakden, Lilian P. Parry, T. B. Whitehead, and E. J. Yates.

Part I.—Peggy Anderson, G. T. Ashley, J. G. Atherton, T. G. Barlow, E. F. Burndred, J. H. Gifford, Cyril Hamwee, Edward Lee, David Livshin, A. S. Ogden, W. E. Rigby, Barbara M. Statham, and W. P. Sweetnam.

University of Bristol

At recent examinations the following candidates were successful :—

FINAL EXAMINATION FOR M.B., CH.B.

J. F. Ackroyd (with second-class honours), E. M. Barber, C. B. Jones, M. M. Lewis, Jane Mackintosh, Joan E. Mackworth, P. C. C. Phelps, and Sybil M. Williams.

Group II (completing examination).—J. S. Richardson.

FINAL EXAMINATION L.D.S.

A. J. H. Orchard and Peggy M. Rooke.

University of Liverpool

At recent examinations the following candidates were successful :—

M.D.

W. Dodd, F. R. Edwards, R. L. Hartley, A. J. Helfet, L. Henry, K. Jilani, J. C. Twomey, and O. Walker.

M.CH.ORTH.

S. R. Chandra, E. W. Knowles, W. R. D. Mitchell, G. C. Sen, G. M. Sleggs, and J. V. Todd.

FINAL EXAMINATION FOR M.B., CH.B.

Part I.—W. F. Christian, J. Collins, D. W. Ellis-Jones, A. H. Hands, Mrs. C. W. L. Harries, M. P. Jones, Joan Macara, S. B. Nelles, P. P. Newman, Margaret E. Parry-Edwards, C. W. R. Roseby, Beryl M. Smith, R. H. M. Stewart, P. W. G. Sutton, and Hilda Walker.

Part II.—S. Ellenbogen, H. Hall, J. S. Hindley, R. R. Knowles, R. J. Parry, Kathleen Pugh-Jones, H. J. Shuttleworth, H. J. H. Soulby, G. O. Thomas, Joan P. Thomson, and A. G. Williams.

Part III.—E. J. Bowmer, H. Buckley, J. L. Chisnall, W. H. R. Cook, D. J. Doherty, O. M. Haarburger, S. Hen, A. L. T. Hutson, Iola L. T. Jones, G. Karstaedt, Helen Kay, G. L. Manson, J. M. Marchant, S. Newman, J. L. Patton, G. I. Roberts, G. R. Thorpe, and G. C. Tweedie.

D.T.M.

A. S. Affara, B. Basu, S. J. Campbell, L. J. Charles, S. K. Chatterjee, S. G. Cowper, S. Garnjana-Goonchorn, C. Haddad, M. N. Hwang, B. S. Jaiswal, H. N. Lee, D. V. Oka, I. S. Parboosingh, H. R. R. E. Ramesar, S. H. Segerman, A. H. D. S. de Silva, and G. C. Watt.

Dr. C. Haddad has been recommended for the Milne medal.

University of Aberdeen

On Dec. 14th the following degrees were conferred :—

M.D.—Alan Grant (with honours); J. A. Cardno and H. D. Chambers (with commendation); H. S. Fraser and W. R. Gauld.

M.B., Ch.B.—L. C. Allan, Margaret P. Allan, John Anderson, S. C. Anderson, John Caie, William Cockburn, N. J. H. Davidson, L. G. Eddey, W. J. Finnie, F. D. Forbes, W. L. Gordon, N. L. Hulse, Marion MacLeod, D. G. McRobbie, Donald Matheson, H. K. Paterson, M. M. Paterson, L. G. Tulloch, James Walker, Margaret J. Walker, Elizabeth A. White, and James Wylie.

University of Edinburgh

On Dec. 16th the following degrees were conferred :—

M.D.—D. M. Anderson, W. G. Annan (*in absentiâ*) A. F. M. Barron, H. E. Collier, Ian Douglas-Wilson, F. O. Graham, C. L. Grant, G. M. Greig, James Hutton, J. S. Lawrence, Agnes R. Macgregor, F. M. Richardson, James Ronald, and A. G. H. Smart (*in absentiâ*).

M.B., Ch.B.—M. A. Ayoub, J. M. Bertram, A. G. Brown, Fanny B. Chisholm, P. S. Clouston, J. H. Comloquoy, S. P. Cornell, W. E. Cowie, H. D. Dobson, Robert Dowie, Janet K. O. Duff, William Finlayson, Wallace Forrester, W. A. Glaubman, R. M. Henderson, G. M. Jolly, Alexander Ketchin, E. H. Lamb, Solomon Lurie, R. D. M'Intyre, Alexander MacLeod, J. W. Martin, C. M. Norman-Williams, A. A. F. Nussiebeh, B. M. Omar, J. C. Robertson, S. P. Robson, A. M. Runcie, W. S. Russell, Annie D. Savill, F. S. Sedgwick, Ellie Seligman, C. S. Singh, Evelyn M. Stewart, L. N. Stewart, Ida E. Wilkinson, P. F. Woo, and R. B. Wylde.

Middlesex Hospital, London

Major J. J. Astor has been elected chairman of this hospital in succession to the late Prince Arthur of Connaught.

Royal College of Surgeons of England

At the recent primary examination for the fellowship of the college the following candidates were approved in the subjects of anatomy and physiology:

J. C. Adams, M.B. Lond., St. Mary's and Middlesex; S. S. Anand, M.B. Punjab, Middlesex; G. P. Arden, M.B. Lond., Univ. Coll.; D. A. Arnott, M.B. N.Z., Univ. Coll.; W. J. Atkinson, St. Bart.'s; A. S. A. G. El Barbary, M.B. Cairo, Middlesex; J. R. Barbour, M.B. Adelaide, Univ. Coll.; R. D. N. Bisset, M.B. N.Z., Middlesex; H. B. Boctor, M.B. Cairo, Univ. Coll. and Middlesex; R. H. F. Brain, M.B. Birm., Middlesex; H. L. Brewer, M.B. Melb., Univ. Coll.; R. T. Campbell, B.A. Oxon., St. Mary's; D. B. Cater, M.B. Camb., Charing Cross; E. H. Clarke, M.B. N.Z.; E. P. Clarke, M.B. Lond., St. Bart.'s and Univ. Coll.; S. H. C. Clarke, M.R.C.S., St. Bart.'s; K. Coen, M.B. Sydney, Middlesex; G. G. Cooley, M.B. Sydney, Univ. Coll. and Middlesex; K. Das, M.B. Calcutta, Middlesex; J. B. David, M.B. Liverp., Univ. Coll.; G. De Lacey, M.R.C.S., London Hosp. and Univ. Coll.; S. R. Dhall, M.B. Punjab, Middlesex; H. V. Dholakia, M.B. Bombay, Middlesex; J. A. Dunlop, M.B. Lond., St. Thos.; A. K. Dutta Gupta, M.B. Calcutta, Univ. Coll.; H. H. G. Eastcott, St. Mary's and Middlesex; M. H. El Zeneiny, M.B. Cairo, Middlesex; E. L. Farquharson, M.D. Edin., F.R.C.S.E., Middlesex; W. G. France, M.B. Leeds, Middlesex; W. R. Gayton, M.B. Melb., Univ. Coll.; N. W. Gill, Middlesex; W. C. Gledhill, M.B. Sydney, Middlesex and Univ. Coll.; N. G. Godfrey, M.B. Sydney, Univ. Coll.; K. T. Goldswain, M.B. Capetown, Univ. Coll.; C. J. Gordon, M.B. Camb., St. Bart.'s and Middlesex; H. Haigh, M.B. Camb., London Hosp.; B. C. Hardy, M.D. Toronto, Middlesex; H. E. Hobbs, M.B. Lond., London Hosp.; F. H. Howarth, Camb. and London Hosp.; E. B. C. Hughes, M.B. Lond., Univ. Coll.; T. I. Hughes, M.R.C.S., Brist. and Middlesex; F. L. Hutter, M.B. N.Z., Univ. Coll.; N. Jungalwalla, M.B. Rangoon, Univ. Coll.; R. G. M. Keeling, M.B. Camb., St. Mary's; N. F. Kirkman, M.D. Manch., Univ. Coll.; N. D. Lakhani, M.B. Bombay, Middlesex; D. G. Lambley, Univ. Coll.; A. M. Large, M.D. Toronto, Univ. Coll. and Middlesex; D. F. Lawson, M.B. Melb., Middlesex; A. R. Leask, M.R.C.S., Guy's and Univ. Coll.; Katharine I. Liebert, M.B. Manch., Univ. Coll.; O. W. Leitch, M.B. Adelaide, Univ. Coll. and Middlesex; M. G. A. Little, M.B. Dubl., Galway and St. Thos.; B. T. Lovell, M.B. Sydney; J. M. McArthur, M.B. Lond., Guy's; H. L. McMullen, Camb. and Middlesex; A. I. S. Macpherson, M.B. Edin., Univ. Coll.; R. A. Mogg, M.B. Wales, Cardiff; A. J. Moon, M.B. Camb., London and Middlesex; K. A. Moore, M.B. Sydney, Univ. Coll.; Perin K. Mullaferoze, M.B. Bombay, Univ. Coll.; G. M. Muller, M.B. Lond., Ceylon and Middlesex; J. C. Newbold, M.B. Camb., St. Bart.'s and Univ. Coll.; A. K. Pardhy, M.B. Camb., Birm. and Middlesex; R. H. Percival, Oxon. and Middlesex; C. C. S. Pike, M.B. Lond., St. Mary's and Middlesex; G. C. L. Pile, M.B. Camb., Middlesex; R. Prasad, M.B. Bombay, Univ. Coll. and Middlesex; J. A. Rhind, M.B. Leeds, Middlesex; J. J. Richmond, M.B. Melb., Univ. Coll.; K. C. Sarbadhikari, M.B. Calcutta, Univ. Coll.; A. H. El Sharkawi, M.B. Cairo, Middlesex; M. V. Sheehan, M.B. N.U.I., Dublin, Univ. Coll., and Middlesex; J. M. Small, M.B. Birm., Middlesex; K. F. Strachan, St. Mary's and Univ. Coll.; J. H. Tasker, Camb. and Univ. Coll.; G. N. Taylor, M.B. Dubl., Univ. Coll.; J. G. Taylor, St. Mary's and Middlesex; E. H. Travers, M.B. Edin., Middlesex; E. G. Tuckwell, B.M. Oxon., St. Bart.'s; D. P. van Meurs, M.B. Lond., St. Thos.; and Eugenie L. Willis, M.B. Camb., Roy. Free.

Society of Apothecaries of London

At a recent examination the following candidates were successful:

Surgery.—G. R. Green and R. G. Ticehurst.
Medicine.—J. A. Bailey, N. P. Desai, C. R. Morgan, and D. Specter.
Forensic Medicine.—J. A. Bailey, N. P. Desai, C. R. Morgan, and D. Specter.
Midwifery.—J. A. Bailey, D. H. Dracup, D. S. Foster, A. B. Kennedy, and G. E. King-Turner.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: J. A. Bailey (Manch.), C. R. Morgan (Guy's), and G. E. King-Turner (Guy's).

Royal College of Surgeons of Edinburgh

At a meeting of the college held on Dec. 16th, with Mr. W. J. Stuart, the president, in the chair, the following candidates who have passed the requisite examinations were admitted to the fellowship:—

John Ernest Andrew, M.D. Dalhousie; Maurice Arnold, M.B. Witw'srand; Norman Bowring Beets, M.R.C.S.; Hari Nandan Bhatt, M.B. Lucknow; William Blackwood, M.B. Edin.; Charles Bowesman, M.B. Dubl.; Denis Parsons Burkitt, M.B. Dubl.; Ralph Jackson Coto, M.B. Melb.; Edward James Crawford, M.B. Edin.; Ian William Davidson, M.D. Toronto; Keith Simpson Fitch, M.R.C.S.; Reginald James Fleming, M.B. Witw'srand; Ian Tuke Fraser, M.B. Edin.; Lovell Dallas Barnard Frost, M.R.C.S.; John Cedric Goligher, M.B. Edin.; Thomas Landles Gordon, M.B. Glasg.; Patrick Reginald Greeves, M.B. Oxon.; Alvah Horatio Hall, M.D. Manitob.; Maurice Edwin Spencer Harrison, M.B. Edin.; Stewart Hamilton Harrison, L.R.C.P.E.; John Kiely, M.D. N.U.I.; Michael Victor Kramer, M.B. Witw'srand; Samuel Layinka Ayodeji Manuwa, M.D. Edin.; Ian Gregor MacGregor, M.B. Edin.; Alan McKenzie, M.B. Glasg.; John Callendar Nicholson, M.B. Edin.; Harold Park, M.B. Edin.; Henry Poston, M.B. Belf.; James Frederic Riley, M.B. Edin.; William Simpson, M.B. Edin.; Alexander Johnston Slessor, M.B. Aberd.; Asita Lal Som, M.B. Calcutta; John Reginald St. George Stead, M.R.C.S.; William John Virgin, M.D. Toronto; and Robert Hildebrand Hunt Williams, M.R.C.S.

Mary Putnam Jacobi Fellowship

This fellowship of $1000 for one year is offered to a woman graduate of an approved medical school for post-graduate work in the medical sciences. If the appointed fellow is not resident in the United States she should preferably undertake her work there. Applications should be sent to the secretary of the fellowship committee, Dr. Phebe L. DuBois, 150, East 73rd-street, New York, N.Y., before April 1st.

Memorial to Sir David Wilkie

It has been suggested by a number of his friends that a memorial to the late Sir David Wilkie should be placed in the Edinburgh University Settlement. The memorial will take the form of an extension to the settlement library Wilkie originally created. To make the memorial as representative as possible two guineas is suggested as the upper limit for subscriptions, which should be sent to the treasurer of the settlement, Cameron House, Prestonfield, Edinburgh, 9.

A Nutrition Panel

The formation of a nutrition panel is announced by the food group of the Society of Chemical Industry. Prof. J. C. Drummond, D.Sc., will be chairman, and Mr. A. L. Bacharach, hon. secretary, and the committee will include Mr. G. W. Monier-Williams, Ph.D., Mr. Albert Green, Ph.D., and Mr. Magnus Pyke, Ph.D. The object of the panel is to study food in relation to health and disease, and at a meeting in London last week there was an informal discussion on nutritional problems of exploration and nutrition at high altitudes.

Ship Captain's Medical Guide Committee

The President of the Board of Trade has appointed a committee to prepare a revised edition of "The Ship Captain's Medical Guide," and to recommend any alterations in the Board of Trade medical scales for merchant vessels necessitated by the revision of the guide. The members of the committee are: Mr. E. H. Watts (chairman), Mr. R. R. Bennett, F.I.C., Mr. P. P. Cole, F.R.C.S., Colonel J. C. Kennedy, M.R.C.P., Dr. M. T. Morgan, Mr. F. H. Norman, Capt. David Smith, and Dr. Ernest Tinker, with Dr. N. M. Goodman, of the Ministry of Health, as medical secretary. Correspondence should be addressed to the secretary, Mr. R. B. Tippetts, mercantile marine department, Board of Trade, Great George-street, London, S.W.1.

Nurses and Their Employers

The council of the College of Nursing has lately been considering a scheme for setting up national and regional councils representative of nurses and employers of nurses. These councils would seek to advance the principle of self-government within the profession to secure the adjustment of differences by mutual consent, and to settle questions regarding general conditions and professional problems, without recourse to rigid legislation. "Although the council of the College regrets that circumstances necessitate the promotion of such negotiating machinery, it feels that it would be better for a body such as the college to draw up a suitable scheme rather than that the nursing profession should submit to plans promoted by non-professional bodies." The college scheme provides for equal representation of employers of nurses—local authorities, hospital boards, nursing associations, factory managements, nurses' coöperations, and the like—and of professional organisations of nurses who are on *any* of the State registers, or on the roll of the Central Midwives Board, or have been accepted for training by approved nursing schools. This national joint organisation, which would be concerned with minimum scales of salary for all nurses, hours of duty, holidays, and other conditions of service in the profession as a whole, would be available for consultation with the Government and other official

organisations; regional councils would be conducted on the same lines; and purely local machinery for individual hospitals, public health departments, and so on would follow suit. This local machinery would, it is hoped, enable members of the staff to express their opinions and would encourage their active interest in the work of the particular institution or association concerned.

Appointments

CROWTHER, S. T., M.R.C.S., D.P.H., Assistant Bacteriologist at the Centre Hospital, Birmingham.
EVANS, C. F., F.R.C.S., Registrar at Charing Cross Hospital.
HOVELL, J. H., M.R.C.S., L.D.S., Hon. Assistant Dental Surgeon to the Royal Dental Hospital, London.
LONES, MARIAN, M.B. Lond., D.P.H., Second Woman Assistant Medical Officer of Health for Hornsey.
MACFARLANE, W. D., M.B. Glasg., F.R.F.P.S.G., F.R.C.S.E., Visiting Surgeon to the Royal Hospital for Sick Children, Glasgow.
MASTERMAN, E. B. Z., B.Chir. Camb., Resident Assistant Surgical Officer at Nottingham City Hospital.
NEWELL, A. G., M.D. Glasg., D.P.H., L.M., Temporary Air-raid Precautions Medical Officer and Assistant Medical Officer of Health for Portsmouth.
REES, W. J., M.Sc. Lond., M.R.C.S., Registrar in the X Ray Diagnostic Department of University College Hospital.
*WILSON, D. S. P., M.Ch. Dubl., F.R.C.S., Part-time Consulting Surgeon at Crumpsall Hospital, Manchester.

London County Council.—The following appointments are announced. A.M.O. (I) or (II) = Assistant Medical Officer (Class I) or (Class II):—

HOAR, C. E. W., M.B. Lond., D.C.P., Assistant Pathologist at Group Laboratory, Lewisham Hospital;
YOUNG, ELIZABETH N., M.D. Glasg., D.P.H., Assistant Pathologist, Southern Group Laboratory, Park Hospital;
BATES, DORIS C., M.B. Sydney, M.C.O.G., A.M.O. (I), Hackney;
LEDINGHAM, L. A., M.B. Aberd., A.M.O. (I), Paddington;
COHDA, GERALD, M.B. Leeds, A.M.O. (II), Dulwich;
OWENS, W. E., M.B. Camb., A.M.O. (II), Dulwich;
CLELAND, W. P., M.B. Adelaide, A.M.O. (II), Highgate;
RENDLE-SHORT, CORALIE W., M.B. Brist., A.M.O. (II), St. James;
FLETCHER, M. W., M.B. Adelaide, A.M.O. (II), St. Mary, Islington;
LLOYD, O. G., M.B. Lond., D.P.H., A.M.O. (II), North-Eastern;
JOHNSON, H. H., M.B. Melb., A.M.O. (II), Queen Mary's, Sidcup;
DOLPHIN, ALPHONSUS, M.B. Dubl., A.M.O. (II), Park;
ELLIS-BROWN, R. S., M.B. Lond., A.M.O. (II), North-Western;
DAVIES, L. E. C., B.A. Oxon., M.R.C.S., Clinical Assistant, Fulham;
WHIDDON, HELEN M., M.B. Sydney, Clinical Assistant, St. Giles';
OWEN, T. K., M.B. Sheff., M.R.C.P., Assistant Pathologist, Group Laboratory, St. Mary Abbots Hospital;
LINEHAN, J. J., M.B. N.U.I., A.M.O. (II), South-Eastern; and
SANDFORD, IRENE E., B.M. Lond., A.M.O. (II), St. Mary, Islington.

King's College Hospital.—The following appointments are announced:—

NIVEN, R. B., B.M. Oxon., Resident Medical Registrar;
KILOH, G. A., M.B. Lond., Crawfurd Medical Registrar; and
STEED, G. R., M.B. Lond., Sambrooke Medical Registrar.

Surrey County Council.—The following Assistant Medical Officers have been appointed:—

BIRRELL, N. V., M.B. Glasg., M.R.C.P., D.P.H.;
BARRETT, R. H., M.R.C.S., D.T.M. & H., D.P.H.; and
MCPHERSON, M.B. St. And., D.P.H., L.D.S.

* Subject to confirmation.

Vacancies

For further information refer to the advertisement columns

Bath, Royal United Hosp.—H.P., at rate of £150.
Battersea General Hosp., S.W.—Two Hon. Jun. Anæsthetists. Also Res. H.P., at rate of £130.
Beverley, East Riding Mental Hosp.—Deputy Med. Supt., £600.
Birkenhead Education Committee.—Asst. School M.O., £500.
Birmingham, Dudley-road Hosp.—Jun. M.O., at rate of £200.
Birmingham and Midland Eye Hosp.—H.S., at rate of £130.
Blackburn County Borough.—Asst. School M.O. and Asst. M.O.H., £600.
Brecon County.—Dist. M.O.H., £800.
Brighton County Borough.—M.O.H., £1250.
Brighton Sanatorium and Infectious Disease Hosp.—Jun. Res. M.O., at rate of £250.
Charing Cross Hosp.—Hon. Clin. Asst. to X Ray, &c., Dents., £50.
Cheshire Education Committee.—Asst. School M.O., £500.
Connaught Hosp., E.—Sen. Res. Surg. O., at rate of £200.
Coventry and Warwickshire Hosp.—Ophth. Reg. and Ophth. Clin. Asst.
Dundee Royal Infirmary.—Radiologist, £1000.
Elizabeth Garrett Anderson Hosp., Euston-road, N.W.—H.P., First, Second, and Third H.S.'s, and Obstet. Asst., each at rate of £50.
Epsom County Hosp.—Res. Asst. M.O., at rate of £250.
Guy's Hosp. Dental School, S.E.—Dental Research Fellow, £400.
Harrogate Royal Bath Hosp.—Res. M.O., £200.
Hosp. for Consumption and Diseases of the Chest, Brompton, S.W.—Three H.P.'s, each at rate of £50.
Hosp. for Diseases of the Skin, Blackfriars.—Hon. Asst. Physician
Hosp. for Sick Children, Great Ormond-street, W.C.—Out-patient Aural Reg. and Out-patient Med. Reg., £175 and £150 respectively.
Hosp. of St. John and St. Elizabeth, 60, Grove End-road, N.W.—Res. H.P., at rate of £100.
Huddersfield Royal Infirmary.—H.S., at rate of £150.
Ilford, King George Hosp.—Hon. Asst. Physician. Also Clin. Ast., 10 guineas.
Ipswich, East Suffolk and Ipswich Hosp.—H.S., £144.
Leeds, St. James's Hosp.—Res. M.O., £350.
Leicester City Isolation Hosp. and Sanatorium.—Res. M.O., at rate of £300.
Lincoln, Bracebridge Heath Hosp.—Deputy Med. Supt., £700.
Lincoln, The Lawn,—Medical Officer, £300.
London Chest Hosp., Victoria Park, E.—Surg. Reg., £100. Also Reg. to Ear, Nose, and Throat Dept., £50.
London County Council.—Asst. M.O.'s (Class I), each £350.
Manchester, Ancoats Hosp.—Asst. Pathologist, £400.
Metropolitan Hosp., E.—Second Aural Surgeon.
Middlesbrough, St. Luke's Mental Hosp.—Asst. M.O. and Deputy Med. Supt., £500.
Newcastle-on-Tyne Babies' Hosp.—M.O., at rate of £160.
Newcastle-upon-Tyne, King's College.—Asst. Bacteriologist in Public Health Laboratory, at rate of £400.
Romford, Oldchurch County Hosp.—Jun. Res. M.O., £250.
Rotherham General Hosp.—Hon. Ophth. Surgeon.
Royal Air Force.—Commissions.
Royal Chest Hosp., City-road, E.C.—H.P., at rate of £100.
Royal Eye Hosp., St. George's-circus, Southwark, S.E.—M.O. for Children's Orthoptic Clinic and Clin. Asst., £100.
Royal Free Hosp., Gray's Inn-road, W.C.—Res. Cas. O., at rate of £150.
Royal Naval Medical Service.—M.O.'s.
Sheffield Royal Infirmary.—Sen. Cas. O., at rate of £150.
Shoreditch Metropolitan Borough.—Asst. M.O.H.. at rate of £650.
Shrewsbury, Royal Salop Infirmary.—Two H.S.'s and Res. H.P., each at rate of £150.
Southall Borough.—Asst. M.O.H., £600.
South Shields, Ingham Infirmary.—Res. Surg. O., £300.
Springfield Mental Hosp., Upper Tooting, S.W.—Med. Supt., £1200.
Watford and District Peace Memorial Hosp.—H.P., at rate of £150
Windsor, King Edward VII Hosp.—Hon. Asst. Ophth. Surgeon.

Births, Marriages, and Deaths

BIRTHS

D'ABREU.—On Dec. 12th, at Cardiff, the wife of Mr. A. L. d'Abreu, F.R.C.S.—a daughter.
HANCOCK.—On Dec. 16th, at the Royal Bucks Hospital, Aylesbury, the wife of Dr. F. R. T. Hancock—a daughter.
HOSKIN.—On Dec. 14th, at 112, Harley-street, W., the wife of Dr. Jenner Hoskin—a son.
NASH.—On Dec. 18th, in London, the wife of Mr. D. F. Ellison Nash, F.R.C.S.—a daughter.
TILLMANN.—On Dec. 18th, at Guy's Hospital, the wife of Dr. W. G. Tillmann—a son.
WATTS.—On Dec. 16th, at St. Thomas's Hospital, the wife of Lieut. J. C. Watts, R.A.M.C.—a daughter.

MARRIAGES

DINGLE—THRIFT.—On Dec. 14th, at All Saints Church, Jesselton, North Borneo, Percival Alfred Dingle, C.B.E., M.R.C.S., to Dorothy Kathleen Thrift.
MASON—SMITH.—On Dec. 3rd, at Chelsea Old Church, J. I. C. Mason, M.B., to Mollie Smith.

DEATHS

EDWARDS.—On Dec. 16th, at Bromley, Kent, John Maltby Edwards, M.R.C.S., L.S.A.
HIGHMOOR.—On Dec. 15th, at Blofield, Norwich, Richard Nicholson Highmoor, M.B. Edin., aged 74.
JOHNSON.—On Dec. 14th, at Wimbledon, S.W., Alice Neville Vowe Johnson, M.D. Brux., F.R.C.S.I., D.P.H.
LAVERY.—On Dec. 14th, at Swindon, Charles Lavery, M.D. Glasg., aged 72.
LYLE.—On Dec. 14th, at Southleigh, Dorking, Frederick William Lyle, M.D. Edin.
PERRY.—On Dec. 17th, at Worthing, Sir Edwin Cooper Perry, G.C.V.O., M.D. Camb., F.R.C.P., aged 82.
PHILIP.—On Dec. 14th, at Roehampton-lane, S.W., Edward Philip, M.B. Aberd.
ROBERTS.—On Dec. 17th, Ernest (Churn) Roberts, M.R.C.S., of Grosvenor-place, S.W., aged 60.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

NOTES, COMMENTS, AND ABSTRACTS

THE CHILD SEPARATED FROM HIS PARENTS

IT is perhaps only the medical officer of health and the medical factory inspector who are in a position to realise and to comment upon the large child population which has to be dealt with as a result of the employment of the mother during the working hours. Rescue workers, probation officers, and child welfare clinics are also cognisant of the number of children who need day nursery care, fostering, boarding out, and "daily minding."

It is obvious that the economic order of a modern non-socialistic community must occasion many types of break in the mother-child relationship. Philanthropy, science, and industry each have made contribution—wise, lame, or lamentable—to meet the problem. But while necessity has largely governed the mode of solution, public health theories and psychological-social doctrines have been coöpted to advise and sometimes to excuse a line which has been adopted. Dr. Ethel Cassie [1] of the Birmingham public health department has outlined in a clear manner the types of children who are kept apart from parents because of economic demands and the anomalous character of the parents themselves. We may well ask, apart from sheer necessity that calls for such separations, what effects do these methods have upon the mind and character of the children in question. Sociological and political theories may have much to say for and against the parental whole-time care of the young—infants, toddlers, and children. But the ultimate word should rest with the psychological physician; particularly with those who have experience of the character and behaviour anomalies which call for treatment at child guidance clinics.

Psychological medicine cannot alone explain the classes of children which call for special care—the orphan child, the deserted, the child of the economically bound mother. Such classes indicate the woof and the warp of social and psychological factors bound upon an economic background. Worthy as the various municipal attempts may be to control and develop child life under these difficult circumstances, Dr. Cassie is convinced of the advantage of any decent family over the most palatial resident nursery. But since there are limits to boarding out, resident nurseries are required and will always be required for special cases. And yet the socially minded child is the most pathetic figure in the life of industrial areas. As Dr. Cassie says, it would require a sympathetic novelist to write up the life of a family in which children are reared in such conditions.

Does not this aspect of child life call for some unified state of organisation to study the child life of our industrial cities and to legislate for them a more human and scientific upbringing? A Ministry of Childhood may prove in the long run as productive of spiritual wealth as a Ministry of Defence is to the conservation of our internal well-being.

PENNY PLAIN, TUPPENCE COLOURED

THE doctor who can no longer restrain himself from writing his reminiscences has the choice of two methods. He can be frankly autobiographical, in which case he must confine himself to the truth, though he may varnish it in the interests of a good story; or he can mingle fact with fancy and call the result a novel. Your genuine autobiographer, who looks back on his experiences, however sensational, from the comparative placidity of retirement, chooses the first method as a matter of course. The second has obvious advantages for those whose primary object is to sell as many copies as possible and hope to do so by showing up the profession, for they can cut their dirty linen to fit the skeleton they have found in the cupboard and no one can object; it is only fiction. The anonymity of the novel form also allows the propagandist to avoid the more serious ethical pitfalls.

Mr. Roy Maplesden, if he is being autobiographical at all, uses the second method. His young Desmond Allen imagined that his failure in an industrial practice must be due to the fact that he would not pander to commercialism, and that the fault lay not in himself but in the "system." As a locum tenens, though he had not met any of his principals, he condemned most of them as money-grubbers on inadequate evidence. Disguised, and equipped with seven unsigned medical cards (how obtained is not stated) he toured the West of England, and, purporting to be a panel patient, visited seven general practitioners. To each he gave a history of cough, hæmoptysis, and loss of weight. Only one of the seven, it seems, troubled to examine him; the remainder merely took his medical card and handed him a prescription for Mist. Expect. Meanwhile his ex-fiancée had bought and resuscitated his moribund practice. Still bulging with idealism the disillusioned Dr. Allen next betook himself to the war in China. On his return he wisely became reconciled to his fiancée and was persuaded by her to return to his now flourishing practice. Unless this imperfect novel was penned merely with mischievous intent, it is presumably founded on fact. If so, the story of the six casual general practitioners is scarcely credible. That in the face of such slipshod methods, they should all have been busy doctors is even less credible. Had Dr. Allen spent less time in thinking about his ideals and more in trying to attain them, he might have found general practice less "soul-destroying" than he supposed. The destructive power of any occupation depends in some measure upon the particular soul concerned.

"Toller" is quite openly a crusader and though his book masquerades as a novel it is, in fact, a battle cry. As an autobiography it is entertaining enough. Dr. Fütüer is an Irishman who grew up in Dublin during the "crossness." Having tried his hand at agriculture and divinity he abandoned these for medicine, and, while a student, made a reputation as an amateur boxer. He practised first in the neighbourhood of Stratford-on-Avon, where he learnt to love his Shakespeare (whom he quotes freely), and then moved to Bromidium, where he set out to preach and practise the cause of medical reform. His contention is that clinical medicine—guesswork at best, he thinks—must give place to mechanical medicine. He holds, quite wrongly, that special methods of investigation are available only to the few and that the mere possession of the apparatus of the specialist would automatically make the general practitioner expert in its use, whence the possibility of errors in diagnosis would be virtually eliminated. The truth is, of course, that most of the ills which the general practitioner is called upon to deal with can perfectly well be diagnosed on purely clinical evidence. To subject every patient to special investigations, assuming that every patient would agree to being investigated, would merely entail a vast waste of time and money.

Dr. Macartney's life has been so full of incident that he has no need of fictional adornment. By working for three years in a drug store and earning a little on the side by "upholstering hens" (taxidermy), gunsmithing, and sign painting, he saved enough money to pay for his medical education in New York, where he became a house surgeon at the Bellevue Hospital. During the past half-century he has practised and continues to practise in a small town on the borders of New York State and Canada. So long an experience would entitle him to be reminiscent even if he were boring, which is far from being the case. Like many of us, he has his therapeutic obsessions—he is quite sure, for example, that he can cure

[1] *Publ. Hlth, Lond.* July, 1938, p. 299.

lumbago with potassium iodide—but his omnipresent sense of humour prevents him from taking himself too seriously. His racy and colloquial autobiography, in which there is always something happening, reveals him as one with a capacity to stand upon his own legs, a devotion to field-sports, and an enthusiasm for the medical art which time cannot stale. The reader who can neither admire Dr. Macartney's sturdy independence and good sense nor relish his wise-cracks proclaims himself a dull dog indeed.

Dr. Ernest Parker has grown old in general practice, and the extracts from his diary reveal a kindly simplicity of character which must confine him to the truth. His book, though it is without literary merit and contains much of antiquated belief and little profound reflexion, is worth reading for the insight it gives into the conduct of practice in a less restless age. The author was never a panel doctor, but he worked hard for all that. He once attended fifteen confinements in 72 hours and, apart from an annual holiday, was always readily accessible to patients except for a couple of hours on Sunday afternoons. Even this scanty period of leisure was sometimes curtailed, for example, on one occasion by an inebriate who imagined that he had broken his windpipe; the account of how this patient was investigated and drastically treated by means of a stomach-tube and six ounces of castor oil is not without a certain grim humour. Those who like ambling reminiscences will enjoy this book.

Dr. Allen might have learnt much from a heart-to-heart talk with Dr. Macartney or Dr. Parker. The one would have shown him how to translate his idealism into practical terms and the other would have soon convinced him that a slack dishonesty is not a universal characteristic of the medical profession.

1. Doctor Allen, G.P. By Roy Maplesden. London: Hutchinson and Co. 1938. Pp. 287. 7s. 6d.
2. Dr. Fütüer. By Toller. London: Arthur H. Stockwell. 1938. Pp. 304. 7s. 6d.
3. Fifty Years a Country Doctor. By William N. Macartney. London: Geoffrey Bles. 1938. Pp. 462. 15s.
4. A Doctor Tells. By Ernest Parker. Leicester: Edgar Backus; London: Simpkin Marshall. 1938. Pp. 211. 5s.

THE "LITTLE FELLOW" DOCTOR

IN the pidgin English of the South Sea Islands the medical orderly or first-aid man is called the "little fellow" doctor, whereas the qualified medical man is the "big fellow" doctor. In cases of illness occurring on the plantations on the numerous islands scattered about the South Seas, the "little fellow" doctors and nurses have to take a great deal of responsibility, because the services of qualified medical men are not easily obtained. Dr. Clifford James, medical officer to the Melanesian Mission Hospital at Fanabu in the British Solomon Islands, has written a short handbook [1] for the use of field workers of the Mission in the hope that the information contained therein will be equally valuable to other residents.

Much practical information about the prevention and treatment of tropical diseases is packed into 78 pages, and the section on malaria, which is well done, contains hints on its prevention in children with directions for making a mosquito-proof cot. Another section deals adequately with the care of white children in the tropics. Dr. James says that in his experience white children can be reared just as well in the tropics as in colder climates, and that the hot weather appears to be a source of happiness to some of them. The diseases are dealt with under their cardinal symptoms, and the section on fever—there are no chapter headings—contains descriptions of malaria, blackwater fever, influenza, dengue, and tonsillitis, which are the common causes of pyrexia in Melanesia. Under the heading of anæmia, hookworm disease and chronic malaria are described, whereas the section on skin diseases includes some facts about the ætiology, prevention, and treatment of tropical ulcers, yaws, leprosy, and the fungus skin diseases, with directions for the treatment of scabies, lice, eczema, and—a simpler name should be found for this—ulcerating granuloma of the pudenda. The dyspepsias and other abdominal conditions seen in the tropics are discussed in some detail and a useful section on the effects of heat is included.

This small book will doubtless be of help to the unqualified medical workers of the South Seas, and indeed to the doctor fresh to the tropics in spite of defects in presentation and style of writing. Admittedly it is difficult to describe a technical subject in language that a layman can understand, but notes jotted down inconsequently in careless English will certainly not teach him as much as he would learn from orderly prose. An intelligent reader will probably be able to interpret the instructions, but many sentences are in themselves obscure—for example (p. 56) it might well be the nurse rather than the patient with pyelitis who is advised to drink six pints of water a day. In descriptions of medical and surgical procedures designed to be carried out by laymen it is especially important that there should be no ambiguity of language. The best section in the book is one dealing with neurasthenia and breakdown in the tropics, because here the author abandons the lecture-note style and writes fluently and with vigour. He convinces us, indeed, that "the tropics is a strange land, full of insects, strange diseases and strange people who cause annoyance to the white man because often he never troubles to understand them or their language, and full of a sodden heat from which there is no escape."

[1] Diseases Commonly Met With in Melanesia. Second edition. By Clifford S. James, M.B. N.Z., D.T.M. and H. Lond., F.R.C.S.E., Medical Officer, Melanesian Mission Hospital, Fanabu, British Solomon Islands. Sydney. 1938. Pp. 78. 4s. 6d.

THROMBOPHLEBITIS AND PSEUDO-EMBOLISM

OCCASIONALLY thrombophlebitis is associated with signs and symptoms suggesting embolism of an artery in the same limb. The exact relation between the two conditions is not perfectly understood. R. T. Payne says: "It is believed that the inflammatory process, beginning outside the vein and leading to its thrombosis, also spreads through the wall of the artery and is followed by arteria occlusion. . . . The alternative view is that the arterial changes are due to spasm" (*Lancet*, 1938, **1**, 1214).

D. Pámpari reports three cases of the sudden onset of circulatory disturbances closely resembling embolism but due to spasm (*Policlinico* (sez. chir.), Oct. 15th, 1938, p. 470). The first symptom, he says, is usually a sudden pain in the limb, which soon becomes cyanosed and colder than its fellow; there is slight œdema and loss of power. In the leg the femoral artery may be found to be pulsating in Scarpa's triangle, but usually there is no pulse in the dorsalis pedis and popliteal arteries. The condition is distinguished from true embolism by the history of an infection likely to cause thrombophlebitis, and by the fact that the onset is less acute. Pámpari treated his first patient by periarterial sympathectomy, followed by hot wet-packs and intravenous injections of Eupaverin for twenty-four hours, and his second and third patients by eupaverin alone; in each case the symptoms rapidly disappeared, giving place to a typical picture of phlegmasia alba dolens.

He quotes Laewen's view that thrombophlebitis causes a rise of venous blood pressure, which by a reflex mechanism causes constriction of the arteries. Sometimes, according to Laewen, this normal response may be so exaggerated as to simulate embolism. Other authors, including Pámpari, believe that the spasm is due to inflammation of the walls of the vein setting up a reflex irritation along the nerves of the adventitia.